STUDY OF DORYLAIMS AND MONONCHS FROM MALNAD TRACTS OF KARNATAKA

ABSTRACT

THESIS

SUBMITTED FOR THE AWARD OF THE DEGREE OF

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IN

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(NEMATOLOGY)

BY

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ABSTRACT

The thesis deals with taxonomic studies of the two major soil nematode groups, viz., the dorylaims and mononchs. The work has been split into two different parts since the dorylaims and mononchs are quite distinct and different from one another. The first part is on the dorylaim nematodes while the second and comparatively smaller part deals with the mononchs.

The Malnad tracts, which are the hilly parts of Karnataka state where most of the plantation crops, viz., coffee, cardamom, tea, pepper and also paddy, coconut, banana are grown, were chosen for the present study. Soil samples from various localities and plants were collected from Malnad tracts and were analysed. As a result of this, a number of species of the Orders Dorylaimida and Mononchida were obtained. In comparison with dorylaim nematodes, mononchs were fewer in numbers. But, as a whole, the Malnad tracts are very rich in nematode fauna of different groups, which may be due to the fact that the soil in these area is very rich in organic matter and a well distributed rainfall throughout the year.

In the present work, detailed studies on the morphological characters, systematic position and diagnostic features of the species of both groups were carried out. An attempt has also been made to study the morphological details of the muscular sheath surrounding the male reproductive organs in the genus ***Axonchium***. Diagnoses of the taxa up to generic rank have been provided.

In all, 95 species of nematodes belonging to the above two Orders, 4 suborders, 8 superfamilies, 16 families, 29 subfamilies, 36 known genera, 6 new genera, 8 known subgenera and 2 new subgenera were collected and studied. A total number of 56 new species have been described in detail with necessary illustrations. Thirty two known species were are aslo being reported with remarks, if any. Six species are re[illegible]ted for the first time from India and also the males of one of the species.

There are 44 new species belonging to the Order Dorylaimida and 12 new species to Mononchida. The 5 new genera, viz., ***Kunjudorylaimus, Neolordellonema, Paraoxybelondira, Duriella*** and ***Paraleptonchus***; two new subgenera, viz., ***Uniqaxonchium*** and ***Nygellolaimellus*** are reported in Dorylaimida while the new genus ***Malnadus*** belongs to Mononchida.

The list of Orders, suborders, superfamilies etc., are presented below :

THE ORDERS

1. Dorylaimida
2. Mononchida

THE SUBORDERS

1. Dorylaimina
2. Nygolaimina
3. Mononchina
4. Bathyodontina

THE SUPERFAMILIES

1. Dorylaimoidea
2. Actinolaimoidea
3. Longidoroidea
4. Belondiroidea
5. Tylencholaimoidea
6. Nygolaimoidea
7. Mononchoidea
8. Mononchuloidea

THE FAMILIES

1. Laimydoridae
2. Aporcelaimidae
3. Qudsianematidae
4. Nordiidae
5. Actinolaimidae
6. Longidoridae
7. Xiphinematidae
8. Belondiridae
9. Tylencholaimidae
10. Leptonchidae
11. Nygolaimidae
12. Nygellidae
13. Mononchidae
14. Mylonchulidae
15. Anatonchidae
16. Mononchulidae

THE SUBFAMILIES

1. Laimydorinae
2. Thornenematinae
3. Aporcelaiminae

4. Sectonematinae
5. Discolaiminae
6. Lordellonematinae
7. Cephalodorylaiminae
8. Pungentinae
9. Actinolaiminae
10. Paractinolaiminae
11. Brittonematinae
12. Longidorinae
13. Xiphinematinae
14. Belondirinae
15. Dorylaimellinae
16. Swangeriinae
17. Tylencholaimellinae
18. Leptonchinae
19. Tyleptinae
20. Belonenchinae
21. Tylencholaimellinae
22. Nygolaiminae
23. Solididentinae
24. Nygellinae
25. Mononchinae
26. Cobbonchinae
27. Mylonchulinae
28. Iotonchinae
29. Mononchulinae

THE KNOWN GENERA

1. ***Laimydorus***
2. ***Coomansinema***
3. ***Aporcedorus***
4. ***Sectonema***
5. ***Mylodiscus***
6. ***Cephalodorylaimus***
7. ***Lenonchium***
8. ***Neoactinolaimus***
9. ***Egtitus***
10. ***Paractinolaimus***
11. ***Paractinolaimoides***
12. ***Stopractinca***

13. ***Longidorus***
14. ***Paralongidorus***
15. ***Xiphinema***
16. ***Belondira***
17. ***Paraoxydirus***
18. ***Discomyctus***
19. ***Chitwoodius***
20. ***Proleptonchus***
21. ***Proleptonchoides***
22. ***Tyleptus***
23. ***Oostenbrinkiella***
24. ***Clavicaudoides***
25. ***Aquatides***
26. ***Solididens***
27. ***Clavicauda***
28. ***Nygellus***
29. ***Mononchus***
30. ***Clarkus***
31. ***Sporonchulus***
32. ***Cobbonchus***
33. ***Mylonchulus***
34. ***Iotonchus***
35. ***Parahadronchus***
36. ***Oionchus***

THE KNOWN SUBGENERA

1. ***Axonchium***
2. ***Tylencholaimus***
3. ***Amphitylencholaimus***
4. ***Opisthotylencholaimus***
5. ***Protylencholaimus***
6. ***Basirotyleptus***
7. ***Coronatyleptus***
8. ***Coronatylencholaimellus***

THE NEW GENERA

1. ***Kunjudorylaimus***
2. ***Neolordellonema***
3. ***Paraoxybelondira***
4. ***Duriella***
5. ***Paraleptonchus***
6. ***Malnadus***

THE NEW SUBGENERA

1. ***Uniqaxonchium***
2. ***Nygellolaimellus***

THE KNOWN SPECIES

1. *Laimydorus dhanachandi*
2. *Aporcedorus punctatus*
3. *Sectonema procta*
4. *Cephalodorylaimus papillatus*
5. *Xiphinema americanum*
6. *Xiphinema insignae*
7. *Xiphinema elongatum*
8. *Belondira nepalensis*
9. *Belondira tenuidora*
10. *Axonchium amplicolle*
11. *Axonchium saccatum*
12. *Axonchium elegans*
13. *Axonchium shamimi*
14. *Paraoxydirus novus*
15. *Paraoxydirus gigas*
16. *Amphitylencholaimus teres*
17. *Proleptonchus aestivus*
18. *Proleptonchus clarus*
19. *Tyleptus striatus*
20. *Basirotyleptus basiri*
21. *Aquatides thornei*
22. *Solididens australis*
23. *Clavicauda symmetricus*
24. *Mononchus tunbridgensis*
25. *Clarkus sheri*
26. *Sporonchulus ibitensis*
27. *Mylonchulus hawaiiensis*
28. *Mylonchulus contractus*
29. *Mylonchulus mulveyi*
30. *Iotonchus trichurus*
31. *Iotonchus basidontus*
32. *Oionchus obtusus*

FIRST REPORT FROM INDIA

1. *Xiphinema simillum*
2. *Belondira ortha*
3. *Belondira tarjani*
4. *Axonchium heynsi*
5. *Paraoxydirus cavenessi*
6. *Tylencholaimus ibericus*

FIRST REPORT OF MALE

1. Iotonchus silvallus

THE NEW SPECIES

1. *Kunjudorylaimus kunjuensis*
2. *Kunjudorylaimus srini*

3. *Coomansinema alduri*
4. *Coomansinema digiticauda*
5. *Mylodiscus parananus*
6. *Neolordellonema nivethi*
7. *Lenonchium anamicus*
8. *Lenonchium singulatus*
9. *Neoactinolaimus protrudus*
10. *Egtitus kodagus*
11. *Egtitus nethrus*
12. *Paractinolaimus chiki*
13. *Paractinolaimoides longicaudatus*
14. *Stopractinca malnadensis*
15. *Longidorus indicus*
16. *Paralongidorus ciaressi*
17. *Xiphinema dimorphis*
18. *Belondira beluri*
19. *Belondira paratumicauda*
20. *Belondira ovatum*
21. *Axonchium cooverkolli*
22. *Axonchium hosakodii*
23. *Axonchium camelliae*
24. *Uniqaxonchium megaspiculum*
25. *Nygellolaimellus muthi*
26. *Paraoxydirus abnormus*
27. *Paraoxybelondira mayili*
28. *Duriella elongatus*
29. *Amphitylencholaimus cosmos*
30. *Opisthotylencholaimus karnataki*
31. *Protylencholaimus longisacca*
32. *Discomyctus bisexualis*
33. *Chitwoodius musae*
34. *Chitwoodius curvistylus*
35. *Paraleptonchus convolusus*
36. *Proleptonchoides equistylus*
37. *Tyleptus oryzae*
38. *Coronatyleptus indicus*
39. *Coronatylencholaimellus amphidius*
40. *Oostenbrinkilla ventrostylus*
41. *Clavicaudoides paratrophurus*
42. *Aquatides minutus*
43. *Clavicauda differentialis*
44. *Nygellus zingli*
45. *Mononchus oryzae*
46. *Mononchus piperae*
47. *Malnadus malnadi*
48. *Cobbonchus inclinatus*
49. *Cobbonchus papillatus*
50. *Cobbonchus citri*
51. *Iotonchus apapillatus*
52. *Iotonchus globibucca*
53. *Iotonchus sringerii*
54. *Iotonchus southi*
55. *Iotonchus minutus*
56. *Parahadronchus magnus*

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This is to certify that the research work presented in the thesis entitled *"Study of Dorylaims and Mononchs from Malnad tracts of Karnataka"* by *Miss M. Dhanam* is original and was carried out under my supervision. I have allowed *Miss M. Dhanam* to submit it to the Aligarh Muslim University, Aligarh in fulfilment of the requirements for the degree of *Doctor of Philosophy* in Agriculture (Nematology).

M. Shamim Jairajpuri 30.5.96

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M. Dhanam

Dedicated

to

My Parents

Teachers

&

Friends

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THE DORYLAIMS

INTRODUCTION

The nematodes are highly diversified group of animals inhabiting all kinds of biotopes. They constitute one of the most dominant and important group of animals which occur in astonishingly unimaginable numbers, in different shapes, sizes and structures. Studies on the parasitic nematodes of animals were started as early as 4,500 B.C., but the plant-parasitic and soil inhabiting nematodes were studied only from the mid 18th century. These nematodes fall under four major categories, viz., the microphagous which are free-living and feed upon micro-organisms; the saprophagous that feed on dead and decaying organic matter; the phytophagous which are parasites of plants and the predaceous that live by killing and feeding on other nematodes and soil organisms.

Much work has been done on the phytophagous group of nematodes in India and abroad. Other three groups have remained comparatively less probed. Taking this into the account, the present work on the dorylaims and mononchs was taken up and their morphology, identification and other details were studied and described. The dorylaims have varied feeding habits while the mononchs are exclusively predatory. Studies on these two groups may help in understanding the bio-diversity and their role in the bio-control of plant parasitic nematodes.

To study and understand any biological organism, the knowledge of its morphology, distribution, population dynamics, diversity and above all, its position or taxonomic status is desirable. Without proper identification of the

organisms, research in any field of biology is rather difficult and will be a great hindrance to further research. The fact that the nematodes, whether they are free-living, plant-parasitic or predatory, play a major role in keeping the eco-balance. Their proper identification is essential. Keeping this in view, the present work was chosen to obtain new information on the two major soil nematode groups, viz., the dorylaims and mononchs.

In India, studies on the nematodes started rather late, in the mid sixties of this century. Pioneer and major work has been contributed by Jairajpuri since the year 1964 both on dorylaims and mononchs. It was Jairajpuri and Siddiqi who erected some of the major families of Dorylaimida apart from contributing a large number of genera and species. More new genera and species were described by Khan, Ahmad,M.,Ahmad,W., Dhanachand, Baqri, Bajaj and some others.

The book on Mononchs by Jairajpuri and Khan (1982), monographs on nygolaims by Ahmad and Jairajpuri (1982), actinolaims by Khan and Jairajpuri (1994) and on the genera ***Xiphinema*** by Bajaj and Jairajpuri (1979), ***Enchodelus*** by Ahmad and Jairajpuri (1980), ***Dorylaimus*** by Shafqat and Jairajpuri (1990) and nematode fauna of Sikkim by Baqri (1991) were some of the major contributions which are of great help to taxonomists both in India and abroad. The book entitled "**Nematode pest identification**" edited by Jairajpuri (1989) also is an outstanding guide-book to researchers in this field. A very important contribution especially on dorylaim nematodes is the book entitled "**Dorylaimida : free-living, predaceous and plant-parasitic nematodes**" by Jairajpuri and Ahmad (1992), which is a milestone in this

field. With the help of this book, one can identify a dorylaim nematode at least up to generic level without much difficulty.

Nematology, particularly the systematic studies, is a young science in India. Major contributions have been from the Northern part of this country while the Southern parts have remained comparatively unprobed and hence it has been thought that studies on the nematodes of the Karnataka state will be helpful. To specify and restrict the working area, the Malnad tracts were chosen.

The area of the present research, the Malnad tracts are the hilly parts of Karnataka state, where most of the plantation crops including coffee, cardamom, pepper etc., are grown in large quantities. Soil of these areas are almost undisturbed and rich in nematode fauna and hence this region was selected for the studies. The principal crop of Malnad tract is coffee, but other crops like banana, coconut, cardamom, pepper, turmeric, tea, areca and paddy are also cultivated. The soil in this region is very rich in organic matter which supports prolific weed growth. Except tea and paddy, most of the other crops were cultivated under a canopy of shade trees of different varieties. All these conditions along with a well distributed rainfall provide a very good climate for the multiplication of nematodes and hence their population in this region is very high. Keeping in view the meagre work on the nematodes from this area, particularly on the dorylaims and mononchs, the present work was initiated so as to obtain more information on the distribution and identification of these animals. This is likely to be of great help for future research in Karnataka in particular but in the country in general.

The present work provides an account of the morphological characters, systematics and diagnostic features with relationship to other closely related genera/species of the Orders Dorylaimida and Mononchida. The dorylaims and mononchs are two different and distinct groups and hence the work has been split into two major chapters in the thesis. An attempt has also been made to provide information on the muscular sheath surrounding male reproductive organs in ***Axonchium***. The present work includes descriptions of 6 new genera; 2 new subgenera and 56 new species. Beside the new genera, subgenera and species, known genera and species are also included in the thesis.

During the course of the present study, soil samples from different parts of the hilly tracts of Karnataka were examined and more than 200 genera of dorylaims and mononchs were observed. It may be concluded that, the Malnad tracts are very rich in nematode fauna, particularly the dorylaims and mononchs. Some of the samples were having numerous genera of the various groups of nematodes.

All the new genera and new species have been described in detail with necessary illustrations. The nematodes for which the males are reported for the first time were also described with some details. Mention has been made of the species reported for the first time from India. However, for the known species, only dimensions are given with remarks if any on their significance.

The present work is the first of its kind from the Malnad area. Hence it is felt necessary that some details should be given on the dignoses of the genera which were chosen for the studies along with the

Orders, Suborders, Superfamilies, Families and Subfamilies etc., to which they belong. This will help other workers from this area who want to do some research in this field. So effort has been made in this thesis to provide as complete information as possible though diagnoses etc., of the higher taxa have been borrowed from other sources which have been acknowledged.

The descriptions of a few new taxa is based on single specimen. All possible efforts were made to collect more material by going once or twice to the same locality, but unfortunately additional specimens were not recovered. For the limited purpose of the thesis and keeping in view the interesting material in hand it was decided to go ahead with description of the species. However, a decision on the publication will be taken only after all these localities are surveyed again and again in search of additional material of these taxa. The study of dorylaim nematodes has been dealt in the first part of this thesis, while the mononchs constitute the second and smaller part.

MATERIALS AND METHODS

Soil Sampling : Soil samples were collected from around the roots of plantation crops, shade trees and other forest trees, paddy, grasses etc The samples were collected in most areas from a depth of about 10-50 cm Relevant information on the host plant, locality and the date of collection were noted for each sample Further processing was done under laboratory conditions

Processing of soil samples Processing of soil samples was done by Cobb's (1918) modified sieving and decantation technique About 400-500 g soil was taken in a bucket and it was mixed thoroughly with a small amount of water Large pebbles, debris and roots washed thoroughly and were removed Soil lumps, if present, were broken and dissolved More water was added in the bucket so as to make it to about three-fourths The suspension was stirred gently with hand to make a homogenous solution After stirring, it was kept undisturbed for about 20-30 seconds to allow the heavy soil and other particles to settle down at the bottom The suspension then was poured to another bucket through a coarse sieve of 2 mm pore size to remove debris, coarse particles, stones, pebbles and other unwanted particles A little more water was added to the second bucket with the suspension, stirred for few seconds and then poured through a 300 mesh sieve of 53 um pore size Nematodes along with fine soil particles were collected on this sieve Residue in the sieve was repeatedly washed with running water by gentle stirring and the supernatent was collected into a container The process was repeated

twice or thrice for the remaining soil in the first bucket for a better recovery of nematodes.

Isolation of Nematodes : The suspension collected in the container was poured on a coarse sieve lined with tissue paper or thinly spread cotton layer. This sieve along with the filtered nematodes was kept on a Baermann's funnel filled with water, just touching the bottom of the sieve. Extra care was taken while placing the seive on the funnel to avoid air bubbles in between the bottom of the sieve and water level. The stem of the funnel was attached to a rubber tube provided with a stopper. This was kept undisturbed for 20-24 hours. Active nematodes migrated from the sieve through the tissue paper or cotton layer into the clean water of the funnel and settled down at its bottom. By carefully opening the stopper, a small quantity of water was taken from the funnel in a cavity block. Nematodes isolated as above were fixed and processed for mounting them on slides for further studies.

Killing and fixing nematodes : The nematodes collected in the cavity block were kept undisturbed for a few minutes so as to allow them to settle at the bottom. Using a fine dropper, excess water was removed carefully. Hot TAF (Courtney, Polley and Hiller, 1955) or 4% formalin was poured onto the nematode suspension which instantly killed and fixed them.

Mounting and Sealing : Nematodes were kept in the fixative for a minimum period of 24 hours, and then transferred to a mixture of glycerine-alcohol (95 parts 30% alcohol and 5 parts glycerine) in a cavity block, one by one, using a fine needle or bamboo splinter. The cavity blocks containing the nematodes were kept in a desiccator containing Calcium chloride. The lids of the cavity

blocks were only partially opened, which enabled desiccation. The nematodes were kept in the desiccator for 15-20 days. Permanent slides were made by placing the nematodes on a glass slide containing a drop of anhydrous glycerine in the centre and three pieces of glass wool of suitable thickness as nematodes. Care was taken to avoid air bubble in the slide while placing the coverslip over the nematodes. After removing the excess glycerine with pieces of filter paper, the coverslip was sealed either with glyceel or nail-polish

Measurements and drawings : All measurements were made on specimens mounted in dehydrated glycerine with the help of an ocular micrometer De Man's (1884) formula for denoting dimensions of nematodes was used Diagrams were made using Nikon optiphot-2 microscope mounted with a drawing tube. In the text um stands for µm.

ABBRIVIATIONS USED IN THE TEXT

L = Total body length

a = Body length / maximum body width

b = Body length / distance from anterior end to the oesophago - intestinal junction

c = Body length / tail length

c' = Tail length / body width at anus or cloaca

V = Distance of vulva from anterior end X 100 / body length

T = Distance from cloaca to anterior most tip of the testes x 100 / body length

G1 = Anterior gonad length x 100 / body length

G2 = Posterior gonad length x 100 / body length

DO = Position of dorsal oesophageal gland orifice from anterior end of oesophagus x 100 / total oesophageal length

DN = Position of dorsal oesophageal gland nucleus from anterior end of oesophagus x 100 / total oesphageal length

DO-DN = Distance between the dorsal oesophageal gland nucleus and its orifice x 100 / total oesophageal length

S_1N_1 = Position of the first ventrosublateral oesophageal gland nucleus from anterior end of oesophagus x 100 / total oesophageal length

S_1N_2 = Position of the second ventrosublateral oesophageal gland nucleus from anterior end of oesphagus x 100 / total oesophageal length

S_2O = Position of the orifices of second pair of ventrosublateral oesophageal gland nuclei from anterior end of oesphagus x 100/ total oesophageal length

S_2N = Position of the second pair of ventrosublateral oesophageal gland nuclei from anterior end of oesophagus x 100 / total oesophageal length.

Type materials : All the type materials and first reports from India were labelled and deposited with the Department of Zoology, Aligarh Muslim University, Aligarh and some other nematology centres.

Publications : For the sake of priority, descriptions of a few new species have already been published or sent for publication with due permission from the authorities concerned. However, to keep the uniformity in descriptions, these species appear as new in the thesis.

HISTORICAL BACKGROUND

Dujardin (1845) described the first ever species of this large group of nematodes. He (l.c.) gave the name ***Dorylaimus stagnalis*** for this species of the Order Dorylaimida, which is a common nematode occurring in several parts of the world. Later in 1865, Bastian emended the genus ***Dorylaimus*** Dujardin, 1845 and its type species, ***D. stagnalis*** and also added new species. He also transferred ***Urolabus palustris*** Carter, 1849 and ***Anguillila linea*** Grube, 1849 to ***Dorylaimus***. Bütschli (1873) redescribed the species of Bastian. The family Dorylaimidae was proposed for ***Dorylaimus***. De Man (1876) had characterized the genus by an axial odontostyle with a distinct aperture, oesophagus in two equal parts; anterior slender and posterior muscular expanded part, amphidelphic gonads, a distinct prerectum and males with ventrally arcuate spicules, lateral guiding pieces and ventromedian supplements.

Tylencholaimus, Diplolaimus and ***Ironus*** were added by Orley (1880) and ***Alaimus, Diptherophora*** and ***Tylolaimophorus*** were proposed by De Man (1880) under this family. Several genera and subgenera, viz., ***Actinolaimus, Antholaimus, Discolaimus, Dorylaimellus, Nygolaimus, Oionchus, Trichodorus*** and ***Xiphinema*** were added by Cobb (1913) under Dorylaimida. Later, in 1920, he described ***Doryllium, Campydora, Axonchium*** and ***Leptonchus***. The various genera were classified by Filipjev in 1927. In 1929 and 1934 he recognised four subfamilies, viz., Dorylaiminae, Alaiminae, Ironinae and Tylencholaiminae

under the family Dorylaimidae. Dorylaimidae was raised to the rank of superfamily by Thorne (1934) with Dorylaimidae and Alaimidae as its families He (l c) proposed the families Leptonchidae and Diptherophoridae and subfamilies Nygolaiminae and Longidorinae under Dorylaimidae in 1935 Later, in 1936, Pearse raised the superfamily Dorylaimoidea to the rank of suborder and placed it under Enoplida

With the publication of monographs by Thorne and Swanger(1936) and Thorne(1939) began the era of modern taxonomy In the first monograph, Thorne and Swanger (1936) established the genera ***Aporcelaimus, Dorylaimoides, Pungentus*** and described a large number of species of these genera and also ***Dorylaimus*** In the second monograph, Thorne (1939) provided a detailed and proper classification of Dorylaimoidea with five famililes, viz , Dorylaimidae, Leptonchidae, Diptherophoridae, Alaimidae, a new family Belondiridae and various other new subfamilies, genera and species of Dorylaimidae Thorne's monograph is one of the outstanding publications and provides a stimulus for further research on dorylaims and most of what he did in the early years of this century is still relevant today In 1942, Pearse proposed the Order Dorylaimida for the dorylaim nematodes

Andrássy (1959,1960) brought major changes in the classification of dorylaims which was widely accepted He spilt the genus ***Dorylaimus*** into nine genera, viz , ***Dorylaimus, Mesodorylaimus, Eudorylaimus, Amphidorylaimus, Prodorylaimus, Thornenema, Meylonema, Thorneella*** and ***Lordellonema*** Several genera and species were added to the group by various scientists which helped in the rapid expansion of the

group. When Clark (1961) revised the classification of Enoplida, he did not recognise Dorylaimida. He proposed a new suborder Alaimina, raised Diptherophoridae to the rank of a superfamily and proposed several subfamilies and families under Dorylaimoidea. Goodey (1963) accepted the Order Dorylaimida and included two suborders Dorylaimina and Alaimina under it but recognised only two superfamilies, Dorylaimoidea and Mononchoidea under Dorylaimina.

Jairajpuri (1964a) revised the classification of Dorylaimoidea with nine families, viz., Dorylaimidae, Longidoridae, Actinolaimidae, Leptonchidae, Nygolaimidae, Nygellidae, Belondiridae, Campydoridae and Aulolaimoididae Belondiridae was raised to superfamilial rank by Thorne (1964) with six families, viz., Belondiridae, Dorylaimellidae, Roqueidae, Nygellidae, Mydonomidae and Oxydiiridae with sevral new genera and subfamilies. Nygolaimidae was raised to superfamilial rank by De Coninck (1965). The genera ***Aporcelaimus, Aporcelaimellus, Makatinus, Aporcelaimoides, Scapidens*** and ***Sectonema*** were placed under the family Aporcelaimidae by Heyns (1965a). The family Actinolaimidae was raised to superfamilial rank by Thorne (1967) with six families, viz., Actinolaimidae, Neoactinolaimidae, Paractinolaimidae, Carcharolaimidae, Trachypleurosidae and Mylodiscidae. He (l.c.) also proposed many new genera under the superfamily. ***Encholaimus*** was placed in the superfamily Encholaimoidea of Dorylaimina by Golden and Murphy (1967).

In 1968, Siddiqi accepted the superfamily Belondiroidea and raised Nygolaimellinae to familial rank under Belondiroidea for the genera

Nygolaimellus and *Nygellus*. Heyns (1968) made several changes in the classification of Nygloaimidae and Nygolaimellidae and did not accept Nygellidae as a valid family since he regarded *Nygellus* under Nygolaiminae. He (l.c.) also split the genus *Nygolaimus* into ten subgenera, viz., *Nygolaimus, Paranygolaimus, Clavicaudoides, Aquatides, Laevides, Feroxides, Solididens, Afronygus, Clavicauda* and *Paravulvus*. Revision of classification of superfamily Dorylaimoidea was done by Siddiqi (1969) with seventeen families, viz., Dorylaimidae, Crateronematidae, Miranematidae, Nordiidae, Tylencholaimidae, Longidoridae, Thorniidae, Dorylaimoididae, Leptonchidae, Tylencholaimellidae, Aulolaimoididae, Belonenchidae, Aporcelaimidae, Discolaimidae, Crateronematidae, Thornenematidae and Qudsianematidae and also proposed several new subfamilies and genera.

In 1969, Jairajpuri proposed the order Mononchida for mononchs which, until then, was considered under Dorylaimida. Andrássy (1969) established the family Prodorylaimidae, under Dorylaimoidea and three new subfamilies, viz., Mesodorylaiminae, Laimydorinae and Afrodorylaiminae under Dorylaimidae with five new genera. The superfamily Diptherophoroidea was raisd to the rank of suborder by Coomans and Loof (1970). Diptherophoroidea and Trichodoroidea were placed under Diptherophorina as superfamilies.

Ferris (1971) revised the classification of Dorylaimida and considered five superfamilies, viz., Dorylaimoidea, Actinolaimoidea, Belondiroidea, Diptherophoroidea and a new superfamily Leptonchoidea under it. Further,

she included the families Dorylaimidae, Tylencholaimidae, Miranematidae, Aporcelaimidae, Nygolaimidae, Nygolaimellidae and Longidoridae in Dorylaimoidea and the families Leptonchidae, Belonenchidae, Dorylaimoididae and Encholaimidae in Leptonchoidea. The families Belondiridae, Dorylaimellidae, Axonchiidae, Mydonomidae, Roqueidae, Oxydiridae, Swangeriidae, Falcihastidae and Nygellidae were placed under the superfamily Belondiroidea and the families Actinolaimidae, Neoactinolaimidae, Paractinolaimidae, Carcharolaimidae, Trachypleurosidae and Mylodiscidae under Actinolaimoidea.

Goseco, Ferris and Ferris (1974-76) revised the classification of Leptonchoidea and included only five families under it. They also revised several genera and described four new genera. Nair (1973-74), Nair and Coomans (1973-74) and Coomans and Nair (1975) have given detailed study of the morphology and systematics of ***Axonchium*** and proposed nine subgenera under this genus. Khan and Ahmad (1975) raised Longidoridae to superfamilial rank. Jairajpuri, Ahmad and Bajaj (1976) proposed Campydoridae for the genus ***Campydora***.

Andrássy (1976) considered four suborders, Dorylaimina, Diptherophorina, Mermithina and Mononchina under Dorylaimida. He (l.c.) further recognised six superfamilies, viz., Encholaimoidea, Nygolaimoidea, Actinolaimoidea, Belondiroidea, Leptonchoidea and Dorylaimoidea in Dorylaimina and only Diptherophoroidea in Diptherophorina. Maggenti (1976) included only the suborders Dorylaimina and Alaimina under Dorylaimida. Mononchida was recognised as a separate Order. Khan, Chawla and Saha (1978)

revised the superfamily Longidoroidea and added Xiphidoridae as a new family and Paralongidorinae as new subfamily and two new genera. Eliava (1978) recognised two suborders, Dorylaimina and Diptherophorina, under Dorylaimida and proposed a new subfamily Lenonchiinae, under Nordiidae. Mulvey and Anderson (1979) established the family Arctidorylaimidae for the genus ***Arctidorylaimus***. Nygolaimoidea was raised to suborder level by Ahmad and Jairajpuri (1979) and in 1982 two more subfamilies, viz., Solididentinae and Paravulvinae were added under Nygolaimidae.

Only Belondiridae, Dorylaimellidae and Swangeriidae were recognised under Belondiroidea by Jairajpuri and Ahmad (1980). The genus ***Dorylaimellus*** was divided into nine subgenera by Jairajpuri and Ahmad in 1980, five of which were raised to generic rank by Siddiqi (1983). Under the family Thornenematinae, Baqri and Jana (1980) recognised only two subfamilies, Thornenematinae and Medalinematinae. By applying the cladistic approach to determine the phylogeny of the leptonchids, Ferris, Ferris and Goseco (1981) provided a new classification for Leptonchidae and thereby recognised only three subfamilies, viz., Leptonchinae, Tyleptinae and Xiphinemellinae.

In 1981, Maggenti recognised three suborders under Dorylaimida, viz., Dorylaimina, Diptherophorina and Nygolaimina and accepted Andrássy's (1976) view on ***Alaimus***. He (l.c.) did not recognise the superfamilies Longidoroidea and Leptonchoidea and placed them as families under Dorylaimoidea. In 1982, however, Maggenti included Alaimina in Dorylaimida in addition to previously accepted three suborders.

The superfamily Campydoroidea was raised to subordinal rank by Jairajpuri (1983) but Siddiqi (1983) transferred the suborder Campydorina to Enoplida. Siddiqi did not recognise Nygolaimina as a separate suborder and transferred Diptherophorina to Triplonchida and raised Alaimina to an Ordinal rank. Coomans and Loof (1986) lowered Brittonematidae to the rank of subfamily and ***Brittonema*** was considered a junior synonym of ***Actinca***. Vinciguerra (1987) discussed Actinolaims and regarded them under superfamily Dorylaimoidea with only three subfamilies, viz., Actinolaiminae, Hexactinolaiminae and Trachypleurosinae. Andrássy (1988) reviewed the superfamily Dorylaimoidea and recognised four subfamilies, viz., Amphidorylaiminae, Prodorylaiminae, Dorylaiminae and Laimydorinae under the family Dorylaimidae and defined 19 genera and 224 valid species. Coomans, Vinciguerra and Loof (1990) synonymised Trachypleurosinae with Actinolaiminae. Vinciguerra and Coomans (1991) synonymised the genus ***Hexactinolaimus*** with ***Paractinolaimus*** and regarded the whole group as a single subfamily Actinolaiminae under Actinolaimidae. Andrássy (1990,91) reviewed the family Qudsianematidae and recognised four subfamilies viz., Chrysonematinae, Discolaiminae, Carcharolaiminae and Qudsianematinae with 25 definite genera and 304 valid species. Eliava and Eliashvily (1990) recognised the family Nordiidae with only two subfamilies, viz., Nordiinae and Pungentinae while the subfamily Cephalodorylaiminae was raised to familial rank. Jairajpuri and Ahmad (1992) reviewed the Order Dorylaimida and emended most of the superfamilies, families, subfamilies and gave detailed description of valid genera and species. They accepted the Order

Dorylamida with only three suborders, viz., Dorylaimina, Nygolaimina and Campydorina. The Dorylaimina has five superfamilies, viz., Actinolaimoidea, Longidoroidea, Belondiroidea, Tylencholaimoidea and Dorylaimoidea. The superfamily Dorylaimoidea was divided into four families, viz., Dorylaimidae, Aporcelaimidae, Qudsianematidae and Nordiidae; superfamily Actinolaimoidea into three families, viz., Actinolaimidae, Trachypleurosidae and Carcharolaimidae; superfamily Belondiroidea with one family, viz., Belondiridae; superfamily Tylencholaimoidea into four families, viz., Tylencholaimidae, Leptonchidae, Mydonomidae and Aulolaimoididae; superfamily Nygolaimoidea into four families, viz., Nygolaimidae, Nygellidae, Aetholaimidae and Nygolaimellidae; superfamily Campydoroidea represented by only one family, viz., Campydoridae.

In the present study, it is felt that the placement of Campydorina is doubtful and hence it is considered that the Order Dorylaimida consists of Dorylaimina and Nygolaimina as its two suborders. However, some nematologits do not accept even Nygolaimina.

ORDER DORYLAIMIDA PEARSE, 1942

Diagnosis : (Emended) Cuticle smooth, fine or coarse transverse striations present. Labial papillae in two circlets : 6 inner, 10 outer. Stoma simple or sclerotized, tubular or eversible. Pharyngeal region sometimes with denticles. Amphids cyathiform, stirrup-shaped or pouch-like with pore or slit-like apertures. Stoma with an axial odontostyle or 'mural tooth', the latter may be attached to the subdorsal or subventral wall of pharynx Odontostyle varies greatly in shape, size and length. Guiding ring single or 'double'. Odontophore rod-like or with terminal knobs or broad flanges at base. Oesophagus in two parts, an anterior slender part and a basal expanded portion, the latter may be cylindrical or small pyriform bulb, rarely with a triquetrous valvular chamber. Nerve ring surrounding anterior slender part of oesophagus, excretory pore and duct are absent. Basal expanded part of oesophagus with five (rarely three) gland nuclei; dorsal gland nucleus always larger than subventrals. Cardia or cardiac glands present at oesophago-intestinal junction. Intestine oligocytous or polycytous. Female reproductive system monodelphic (mono-prodelphic or mono-opisthodelphic) or amphidelphic. Vulva transverse or longitudinal or a simple pore. Vagina with or without sclerotization. Males with a pair of opposed testes, spicules paired; gubernaculum and lateral guiding pieces present or absent. Ventromedian supplements few to numerous, either spaced or contiguous. Prerectum present. Caudal glands absent. Tail shapes and sizes variable, similar or dissimilar in sexes.

Type suborder :

Dorylaimina Pearse, 1936

Other suborder :

Nygolaimina Ahmad and Jairajpuri, 1979

SUBORDER DORYLAIMINA PEARSE, 1936

Diagnosis : (Emended). Stoma simple or sclerotized. Cuticularized pieces may be present around oral aperture. Amphids cup or stirrup-shaped with slit-like apertures. Odontostyle axial, solid to rod-like; lumen and aperture wide. Guiding ring single or 'double'. Odontophore rod-like or arcuate, sometimes with knobs or flanges at the base. Oesophagus with two parts; anterior slender and a posterior muscular expanded part which may be cylindroid occupying about one-third to half of total oesophageal length or a pyriform basal bulb, rarely with a triquetrous valvular chamber. Expanded part of oesophagus sometimes enclosed in a sheath of spiral or straight muscle bundles. Nerve ring surrounding anterior slender part of oesophagus. Oesophageal gland nuclei usually five, rarely three. Cardia round, conoid to elongate-conoid with or without a disc. Female reproductive system monodelphic (mono-prodelphic or mono-opisthodelphic) or amphidelphic. Vulva transverse or longtudinal or a simple pore. Vagina with or without sclerotization. Male with paired, opposed testes; spicules paired, gubernaculum and lateral guiding pieces present or absent. Ventromedian supplements few to numerous, spaced or contiguous. Prerectum of varied length. Tail shapes and sizes variable, similar or dissimilar in sexes.

Type superfamily :

Dorylaimoidea De Man, 1876

Other superfamilies :

Actinolaimoidea Thorne, 1939

Belondiroidea Thorne, 1939

Longidoroidea Thorne, 1935

Tylencholaimoidea Filipjev, 1934

SUBORDER NYGOLAIMINA AHMAD AND JAIRAJPURI, 1979

Diagnosis : (After Jairajpuri and Ahmad, 1992). Nematodes with mural tooth located on the subventral wall of pharynx. Pharynx eversible with distal, median and proximal portions. Proximal and median parts thick-walled, distal part thin-walled. Oesophagus with an anterior slender and posterior expanded basal parts. Oesophago-intestinal junction usually with three cardiac glands. Female reproductive system amphidelphic, rarely mono-opisthodelphic. Prerectum present. Males with paired testes, spicules, lateral guiding pieces. Gubernaculum may or may not be present. Tails vary in shapes and structure; similar in sexes.

Type and only superfamily :

Nygolaimoidea Thorne, 1935

SUPERFAMILY DORYLAIMOIDEA DE MAN, 1876

Among the various groups of the suborder Dorylaimina the nematodes of the superfamily Dorylaimoidea outnumber others in having large number of genera and species the world-over. Initially it was erected as family Dorylaimidae for the genus ***Dorylaimus*** by De Man (1876). Under the family Dorylaimidae, Filipjev (1927) accepted only Dorylaiminae but later included Alaiminae, Ironinae and Tylencholaiminae. It was Thorne (1934) who raised it to superfamilial rank and proposed the families Dorylaimidae and Alaimidae under it. He included two more families, viz., Leptonchidae and Diptherophoridae in the year 1935. In 1939, Thorne proposed Belondiridae also under Dorylaimoidea. Goodey (1963) recognised six families, viz., Dorylaimidae, Opailaimidae, Belondiridae, Nygolaimidae, Leptonchidae and Campydoridae. Jairajpuri (1964a) recognised nine families, viz., Dorylaimidae, Longidoridae, Actinolaimidae, Leptonchidae, Nygolaimidae, Nygellidae, Belondiridae, Campydoryidae and Aulolaimidae. A new family Aporcelaimidae was proposed by Heyns (1965a). Belondiridae and Actinolaimidae were raised to superfamilial rank by Thorne (1964, 1967). Siddiqi (1969) revised the classification and proposed several new families. The family Prodorylaimidae was added by Andrássy (1969). Ferris (1971) recognised only seven families and Leptonchidae was raised to superfamilial rank. Longidoroidea was established by Khan and Ahmad (1957). Campydoridae was given superfamilial rank by Jairajpuri ***et al.*** (1976) and later to subordinal rank by Jairajpuri (1983). The family Arctidorylaimidae was established by

Mulvey and Anderson (1979) and Kochinematidae by Darekar and Khan (1979). Baqri and Jana (1980) revised the family Thornenematinae and subfamily Medalinematinae was placed under it. Carbonell and Coomans (1985, 1986, 1987) reviewed Thornenematidae and its genera. They (l.c.) synonymised ***Jairajpuria*** and ***Medalinema*** proposed by Baqri and Jana (1980) and erected ***Sclerolabia***. Andrássy (1986) proposed several new genera He (l.c.) in the year 1990, while reviewing the superfamily Dorylaimoidea included only Carcharolaiminae, Discolaiminae, Chrysonematinae and Qudsianematinae under the family Qudsianematidae. Jairajpuri and Ahmad (1992) revised the whole group and considered the superfamily Dorylaimoidea, with four families, viz., Dorylaimidae, Aporcelaimidae, Qudsianematidae and Nordiidae. They included six subfamilies, viz., Qudsianematinae, Thorniinae, Discolaiminae, Lordellonematinae, Crateronematinae, Chrysonematinae and Hulqinae under the family Qudsianematidae. Views of Jairajpuri and Ahmad (1992) have been accepted in the present work. Siddiqi (1995) described seven new genera and forty two species of dorylaim nematodes.

Diagnosis : (Emended). Cuticle smooth or transversely striated, rarely with longitudinal ridges or lamelliform structures. Vestibule straight and tubular. Odontostyle hollow, dorsal aperture oblique. Amphids often with stirrup or cup-shaped fovea and slit-like apertures. Guiding ring single or 'double'. Odontophore rod-like, rarely with knobs or flanges at base. Oesophagus in two parts, occupying about one-third to two-thirds total oesophageal length. Female reproductive system monodelphic or amphidelphic. Vulva transverse,

longitudinal or pore-like. Spicules arcuate; lateral guiding pieces usually present. Gubernaculum absent. Ventromedian supplements few to numerous, spaced or contiguous, rarely in groups. Prerectum distinct. Tails similar or dissimilar in sexes.

Type family :

Dorylaimidae De Man, 1876

Other families :

Nordiidae Jairajpuri and A.H. Siddiqi, 1964

Aporcelaimidae Heyns, 1965

Qudsianematidae Jairajpuri, 1965

FAMILY DORYLAIMIDAE DE MAN, 1876

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle with fine transverse striations, rarely with distinct longitudinal ridges. Odontostyle with wide lumen and aperture. Odontophore rod-like, lacking basal knobs or flanges. Guiding ring single or 'double'. Basal expanded part of oesophagus about one-third to one-half oesophageal length. Female reproductive system either mono-opisthodelphic or amphidelphic. Males with paired and opposed testes, arcuate spicules and lateral guiding pieces. Ventromedian supplements few to numerous; spaced or contiguous, rarely grouped. Tails similar or dissimilar in sexes.

Type subfamily :

Dorylaiminae De Man, 1876

Other subfamilies :

Laimydorynae Andrássy, 1969

Thornenematinae Siddiqi, 1969

Arctidorylaiminae (Mulvey and Anderson, 1979) Jairajpuri and Ahmad, 1992

SUBFAMILY LAIMYDORINAE ANDRÁSSY, 1969

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle without longitidinal ridges. Odontostyle with wide lumen and aperture. Odontophore rod-like. Guiding ring single or 'double'. Expanded part of oesophagus about one-half oesophageal length. Oesophageal gland nuclei and orifices as in Dorylaiminae. Vulva transverse or longitudinal. Female reproductive system amphidelphic. Ventromedian supplements contiguous or spaced. Tails either similar or dissimilar in sexes.

Type genus :

Laimydorus Siddiqi, 1969

Other genera :

Mesodorylaimus Andrássy, 1959

Prodorylaimus Andrássy, 1959

Amphidorylaimus Andrássy, 1960

Afrodorylaimus Andrássy, 1960

Drepanodorylaimus Jairajpuri, 1966

Calodorylaimus Andrássy, 1969

Idiodorylaimus Andrássy, 1969

Prodorylaimium Andrássy, 1969

Minidorylaimus Andrássy, 1972

Calcaridorylaimus Andrássy, 1986

Miodorylaimus Andrássy, 1986

Kunjudorylaimus N. Gen.

GENUS *LAIMYDORUS* SIDDIQI, 1969

Siddiqi (1969) established the genus ***Laimydorus*** to accommodate those species having a long body, cuticle without ridges or punctations, amalgamated lips, massive odontostyle, 'double' guiding ring, amphidelphic ovaries, long filiform tail in the females and males with short, conoid tail with a rounded tip. He made ***Dorylaimus prolificus*** Thorne and Swanger, 1936 as the type species of the genus. Species of this genus are widespread in India. Baqri and Jana (1982) have provided a key to the species of ***Laimydorus***. Monosexual species of this group were separated by Loof in 1985 and placed under a new genus ***Prodorylaimus***. Jairajpuri and Ahmad (1992) have not accepted this proposal and placed all the species under ***Laimydorus***. In the present study, a known species of ***Laimydorus*** collected from Karnataka state is reported.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body generally more than 2 mm long. Cuticle thick, with fine striations, without ridges or punctations, sometimes with scattered radial striae. Lip region continuous or offset, lips amalgamated. Amphids with stirrup-shaped fovea and large apertures. Odontostyle massive, with wide lumen and aperture. Guiding ring sclerotized,

'double'. Odontophore rod-like. Oesophagus very muscular, gradually enlarging near middle. Cardia large, digitate. Female reproductive system amphidelphic. Vulva longitudinal. Ventromedian supplements numerous, contiguous. Spicules long, dorylaimoid, with lateral guiding pieces. Tails long, filiform in females and short, conoid with rounded tip in males.

Type species :

Laimydorous prolificus (Thorne and Swanger, 1936) Siddiqi, 1969

Other species :

There are about 40 species in this genus including ***L. africanus*** Botha and Heyns, 1993. For the list see Jairajpuri and Ahmad (1992).

LAIMYDORUS DHANACHANDI JAIRAJPURI AND AHMAD,1983

Measurements :

Females (n = 2) : L = 3-3.4 mm, a = 68.6-78.8; b = 5.7-8.5; c = 8.2-12.6; c' = 14.7-15.6; V = 45-46; Gl = 17.5-26.7; G2 = 11.2-17.5; odontostyle 28-29.5 um; odontophore 34-35 um; guiding ring 16-18 um; oesophagus 397-532 um; expanded part of oesophagus 213 - 331 um; nerve ring 125-191 um; cardia 19-28 um; prerectum 180-184 um; rectum 27-29 um; tail 368-372 um; ABD 23-25 um.

Male (n = 1) : L = 3.3 mm; a = 80.6; b = 5.4; c = 188.2; c' = 0.7; T = 60.7; spicule 48.5 um; ventromedian supplements 15; odontostyle 29.5 um; odontophore 35 um; oesophagus 612 um; expanded part of oesophagus 331 um; guiding ring 18 um; nerve ring 156 um; cardia 28 um; prerectum 199 um; rectum 47 um; tail 18 um; ABD 27 um.

Habitat and locality : Collected from soil around roots of aquatic grasses (unidentified) from near Arvind dairy, Chikmagalur Distt, Karnataka.

Remarks : The present specimens conform to the original description of ***L. dhanachandi*** Jairajpuri and Ahmad, 1982 except that they have a longer tail, spicules and odontostyle (tail 117-150 um; spicules 40-42 um; and odontostyle 24-25 um in the type material).

GENUS *KUNJUDORYLAIMUS* N.GEN.

In the present study two species of dorylaims which share characters of ***Prodorylaimium*** Andrássy, 1969 and ***Paroriverutus*** Carbonell and Coomans, 1982 were found. Both the females and males of the two species show unique body posture upon fixation, straight at anterior portion, curved dorsally at midbody, either curved ventrally or straight in tail region. Lips are continuous with body, rounded, papillae are distinct but not raised above the lip contour, the amphids are bilobed and the fovea duplex. The name ***Kunjudorylaimus*** n. gen. is proposed for their reception. The new genus is named after Kunju, a young boy who helped me in collecting the soil, which yielded these new worms. The new genus is represented by two new species, viz., ***K. kunjuensis*** n.sp. and ***K. srini*** n.sp. It is placed in the subfamily Laimydorinae, Andrássy, 1969 because of the presence of a long odonotstyle, 'double' guiding ring and spaced ventromedian supplements.

Diagnosis : Body medium-sized and slender, straight in the anterior portion, dorsally arcuate at midbody and ventrally arcuate at tail. Cuticle thin, finely striated. Lateral chords about 1/4 body width wide at midbody. Lip region continuous, rounded, papillae distinct but not raised. Amphids wide, bilobed, fovea duplex. Guiding ring 'double'. Odontostyle longer than one lip width, pointed; aperture and lumen wide. Odontophore straight, longer than odontostyle, weakly sclerotized, rod-like. Anterior oesophagus moderately muscular. Posterior portion expanding gradually, occupying about one-half total oesophageal length. Cardia moderately long, bluntly conoid to

tongue-shaped. Cardiac disc present. Female reproductive system amphidelphic. Vulva transverse, sclerotized, opening wide. Prerectum short. Rectum longer than ABD. Anus a small transverse slit. Tail long and filiform. Caudal papillae present. Males with dorylaimoid spicules, lateral guiding pieces and 8-13 weakly developed, spaced, ventromedian supplements Tail as in females, long, filiform.

Type species :

Kunjudorylaimus kunjuensis n.sp.

Other species :

Kunjudorylaimus srini n. sp.

Relationship : ***Kunjudorylaimus*** n.gen. is distinctive because of its body posture upon fixation, the amphid shape, very long odontostyle and odontophore, in the shape of vulva, cardiac disc and in having poorly developed and spaced ventromedian supplements. The new genus is closely related to ***Prodorylaimium*** Andrássy, 1969 in having spaced ventromedian supplements, long filiform tails in both sexes, long odontostyle, 'double' guiding ring and amphidelphic gonads. It differs from ***Prodorylaimium*** in the shape of lip region, amphids, odontostyle, odontophore and in having more ventromedian supplements. The lip region is narrower than the adjoining body, truncated, amphids stirrup-shaped, odontostyle massive, lumen wide, odontophore short, ventromedian supplements 6-10 and prominent in ***Prodorylaimium***. ***Kunjudorylaimus*** also resembles ***Paroriverutus*** Carbonell and Coomans, 1982 in having a long odontostyle, odontophore, muscular swellings at odontophore region, amphidelphic gonads and long filiform tails

in both sexes, but it distinctly differs from it in the absence of raised lip papillae, in the shape of amphids, odontophore, number of ventromedian supplements and in the shape of tails The labial papillae are distinctly raised, odontophore is not longer than odontostyle, ventromedian supplements are only 4 or 5 in number and tail is not whip-like in ***Paroriverutus.***

KUNJUDORYLAIMUS KUNJUENSIS N.SP.

(Fig 1)

Measurements :

Holotype female : L = 2 0 mm, a = 60 3, b = 5 0, c = 7 9, c' = 13 2, V = 45, G1 = 8 8, G2 = 10 5, odontostyle 21 um, odontophore 34 um, oesophagus 409 um, expanded part of oesophagus 191 um, prerectum 115 um, rectum 31 um, tail 257 um, ABD 19.5 um

Paratype females (n = 12) : L = 2 0-2 3 mm, a = 56 6-60 3 (58 2 ± 1 5), b = 5-5 5 (5 2 ± 0 2), c = 5 9-7 9 (6 7 ± 0 9), c' = 13 2 - 18 1 (16 ± 1 9), V = 43-47, G1 = 9-19, G2 = 11-12, odontostyle 20-22 um, odontophore 32-34 um, oesophagus 375-410 um (399 5 ± 14 8) um, expanded part of oesophagus 191-215 (203 ± 9) um, prerectum 73-115 (89 ± 21 0) um, rectum 31-40 um, tail 257-346 (316 ± 39.5) um, ABD 19-21 um

Paratype males (n = 15) : L = 2-2 4 (2 2 ± 0 2) mm, a = 57 4-63 5 (60 4 ± 2 3), b = 4 9 - 6 1 (5 5 ± 0 4), c = 5-7 3 (6 2 ± 0 8), c' = 15 2 - 19 3 (17 7 ± 1 4), T = 44-52, spicule 32-37 um; lateral guiding pieces 7-9 um, ventromedian supplements 11-13, odontostyle 21-22 um, odontophore 31-34 um, oesophagus 385-415 (399.7 ± 12 9) um, expanded part of

oesophagus 189-221 (202.9 ± 16.5) um; prerectum 115-172 (152.4 ± 22) um; rectum 41-52 um; tail 323-397 (358.6 ± 27.6) um; ABD 20-23 um.

Description :

Female : Body long and bulky, posture straight at anterior portion, curved dorsally at midbody, either curved or straight at tail. Cuticle thin, finely striated. Lateral chords about 1/4 body width at midbody. Lip region continuous, rounded, amalgamated, 11 - 13 um wide, 6 - 7 um high, papillae distinct but not raised. Guiding ring 'double', fixed ring located at 11 - 14 um from anterior end. Amphids bilobed, fovea duplex, about 3/4ths lip width wide. Odontosytle strongly sclerotized, about two lip widths long, lumen wide, aperture about 1/3 of its total length, anterior tip sharp. Odontophore about one and a half odontostyle lengths long, weakly sclerotized. Odontophore base region spindle-shaped. Anterior part of the oesophagus long and moderately muscular. Oesophageal expansion gradual. Basal expanded part of oesophagus occupying about 48-53% of total oesophageal length. DN a little far from DO. Nerve ring at 125-151 um from anterior end. Cardia short, bluntly conoid, about 11 - 14 um long. Cardiac disc present.

Reproductive system amphidelphic, vulva pre-equatorial, transverse, opening wide. Junction of vulva-vagina with triangular cuticular pieces, a little inside the body. Vaginal walls weakly sclerotized, distinctly narrowed at mid portion, vagina about one-half body width deep. Uterus a long sac filled with spindle-shaped sperms. Well developed sphincter present at oviduct-uterus junction. Ovaries with oocytes arranged in a single line except at distal end. Prerectum moderately long, about 3.8 - 5.9 anal body widths

long Anus a transverse slit Tail very long filiform, about 13-18 anal body widths long Caudal papillae somewhat obscure, two on each side

Male : Similar to females, except in having more ventrally curved tail portion Prerectum longer than females, 5 6 - 8 1 anal body widths long Ventromedian supplements widely spaced, poorly developed, consisting of an adanal pair, 11-13 ventromedians Distance between cloaca and the first ventromedian supplement about 59-65um Spicules dorylaimoid, bulky, arcuate, 32-37 um medially Lateral guiding pieces weakly developed, about 7 - 9 um long Tail very long and filiform, about 15 - 19 anal body widths long Caudal papillae two on each side

Type locality : Soil around roots of grasses (unidentified) near Hirur, Chikmagalur Distt

Type material : Collected in September, 1993 Holotype female on slide ***Kunjudorylaimus kunjuensis*** n gen , n sp /1 and paratype females and males on slides ***Kunjudorylaimus kunjuensis*** n gen n sp /2-4

KUNJUDORYLAIMUS SRINI N.SP.

(Fig 2)

Measurements :

Holotype female : L = 1 7 mm, a = 64 1, b = 4 9, c = 6 1, c' = 15 2, V = 45 6, G1 = 12, G2 = 10 7, odontostyle 15 um, odontophore 23 5 um, oesophagus 347 um, expanded part of oesophagus 166 um, prerectum 47 um, rectum 32 um, tail 281 um, ABD 18 um

Paratype females (n = 8) : L = 7 - 1 9 (1 8 ± 0 1) mm, a = 60 5 - 64

(62 2 ± 1 7), b = 4 9 - 5 4 (5 2 ± 0.2); c = 6 1-6 9, c' = 15 -16 (15 6 ± 0 3), V = 44-48 (46 ± 1 8), G1 = 9.5 - 12 6, G2 = 10 7 - 15 9, odontostyle 15 - 16 um, odontophore 23 5 - 25 um, oesophagus 337 - 372 um (353 ± 13 9) um, expanded part of oesophagus 156 - 184 (170 5 ± 11 3) um, prerectum 47 - 75 (61 ± 10 7) um , rectum 26 5 - 32 um, tail 272 - 294 (281 ± 8 6) um, ABD 18 - 20 um

Paratype males (n = 9) : L = 1 6 - 1 9 (1 8 ± 0 1) mm, a = 58 8 - 71 5 (63 ± 5 9), b = 5 2 - 5 8 (5 4±0 3), c = 6 5 - 7 3 (7 1 ± 0 4), c' = 14-15 4 (14 1 ± 1 1), T = 49 - 50, spicule 29 - 31 um, ventromedian supplements 8-10, odontostyle 15 um, odontophore 23 5-25 um, oesophagus 326-348 (333 ± 10 5) um, expanded part of oesophagus 136 - 169 (156 ± 14 2 um), prerectum 79 - 118 (94 8 ± 16.4) um; rectum 34 - 46 um, tail 235 - 272 (257 ± 79) um, ABD 18 - 20 um

Description :

Female : Body medium-sized, slender, attains typical posture of the genus upon fixation Cuticle thin, finely striated Lateral chords about 1/4th body width at midbody Lip region continuous, rounded, amalgamated, papillae distinct but not raised, about 10 um wide, 4 um high Amphids about 3/4ths of lip width wide, bilobed, fovea duplex Guiding ring 'double', fixed ring located at 10 - 12 um from anterior end Odontostyle strongly sclerotized, one and a half lip widths long, aperture about 1/3 of its total length, lumen distinct Odontophore about one and a half odontostyle lengths long, weakly sclerotized, odontophore base region spindle-shaped, followed by a long, moderately muscular anterior part of oesophagus Basal expanded portion

occupying about 46 - 49% of total oesophageal length. DN at a distance from DO. Nerve ring located at 118 - 126 um from anterior end. Cardia about 10 - 12 um long, bluntly conoid to tongue-shaped. Cardiac disc present

Reproductive system amphidelphic. Vulva transverse, opening wide Vulva-vagina junction with triangular cuticular pieces located a little inside the body Vaginal walls faintly sclerotized, narrowed in middle, vagina about one-half body width deep. Both reproductive branches equally developed Uterus filled with spindle-shaped sperms. Well developed sphincter present at oviduct-uterus junction. Oocytes arranged in a single row except at tip. Prerectum about 2.6 - 4.3 anal body widths long. Rectum about 1.5 anal body widths long. Anus a transverse slit Tail very long, filiform. Caudal papillae two on each side.

Male : Similar to females. Tail portion more ventrally curved. Prerectum longer than in females, 4.3 - 6.7 anal body widths long. Supplements an adanal pair and 8-10 ventromedians, poorly developed, regularly spaced. Distance between cloaca and the first ventromedian supplement about 50-56 um. Spicules dorylaimoid, bulky, arcuate, 29 - 31 um long medially. Lateral guiding pieces poorly developed, about 6 - 7 um long. Tail long filiform, about 15 - 16 anal body widths long. Caudal papillae two on each side.

Type locality : Soil around roots of cardamom (***Elettaria cardamomum***) from Mudigeri.

Type material : Collected in August, 1993. Holotype female on slide ***Kunjudorylaimus srini*** n.sp./1 and paratype females and males on slides ***Kunjudorylaimus srini*** n.sp./2-4.

Relationship : ***Kunjudorylaimus srini*** n.sp. resembles the type and only other species of the genus ***Kunjudorylaimus kunjuensis*** in general morphology and typical body posture, but differs in having smaller body, body parts and thereby body ratios.

SUBFAMILY THORNENEMATINAE SIDDIQI, 1969

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle without longitudinal ridges. Vestibule provided with small to well-developed, sclerotized plates. Odontostyle dorylaimoid, often dorsally bent at its tip, aperture about one-third of its length. Guiding ring single or 'double'. Expanded part of oesophagus about one-third oesophageal length. Second pair of ventrosublateral glands and nuclei located far anterior to oesophageal base. Vulva transverse. Female reproductive system mono-opisthodelphic or amphidelphic. Tails similar or dissimilar in sexes.

Type genus :

Thornenema Andrássy, 1967.

Other genera :

Willinema Baqri and Jairajpuri, 1967

Sicaguttur Siddiqi, 1971

Indodorylaimus Ali and Prabha, 1974

Timminema Khan, 1978

Opisthodorylaimus Ahmad and Jairajpuri, 1982

Fuscheila Siddiqi, 1982

Sclerolabia Carbonell and Coomans, 1985

Silvallis Ahmad and Jairajpuri, 1986

Coomansinema Ahmad and Jairajpuri, 1989

Paratimminema Rahaman, Ahmad and Khan, 1993

GENUS *COOMANSINEMA* AHMAD AND JAIRAJPURI, 1989

Ahmad and Jairajpuri (1989) established the genus ***Coomansinema*** for those species of dorylaims with amalgamated, truncate and continuous lip region, without labial and post-labial sclerotization, massive odontostyle with thickened tip and bent ventral arm. ***C. dimorphicauda*** was proposed as its type species. *C. oryzae* Ahmad, 1993 was the only other species described so far. In the present study, soil samples collected from Karnataka state yielded two new species of the genus ***Coomansinema*** which are illustrated and described in the following.

Diagnosis : (Emended) Body slightly ventrally curved upon fixation. Cuticle thick with fine transverse striations. Lip region amalgamated, truncate, continuous with body. Labial and post-labial sclerotization absent. Amphids duplex. Odontostyle with thickened tip, ventral arm slightly bent near middle, aperture about one-third of its length. Odontophore rod-like. Expanded part of oesophagus 45-46% of total oesophageal length, S_1N_1 at some distance from each other S_2N far anterior from base of oesophagus. Cardia short, hemispheroid. Female reproductive system amphidelphic, both genital branches equally developed and functional. Vulva longitudinal or transverse with strong distal sclerotization. Males with dorylaimoid spicules, lateral guiding pieces and 12-15 ventromedian supplements arranged in a series. Female tail short, convex-conoid or cylindroid, broadly rounded with a short to long projection at tip. Male tail short-conoid with rounded terminus.

Type species :

Coomansinema dimorphicauda Ahmad and Jairajpuri, 1989.

Other species :

C. oryzae Ahmad, 1993

C. alduri n.sp.

C. digiticauda n.sp.

COOMANSINEMA ALDURI N.SP.

(Fig. 3)

Measurements :

Holotype female : L = 2.1mm; a = 38; b = 4.5; c = 17.5; c' = 3.4; V = 56; G1 = 12.5; G2 = 13; odontostyle 21 um; odontophore 29.5 um; oesophagus 457 um; expanded part of oesophagus 229 um; prerectum 57 um; rectum 59 um; tail 118 um; ABD 35 um.

Paratype female (n = 1) : L = 1.8 mm; a = 35; b = 4.1; c = 21; c' = 2.4; V = 58; G1 = 16; G2 = 15; odontostyle 22 um; odontophore 29 um; oesophagus 445 um; prerectum 51.5 um; rectum 59 um; tail 82 um; ABD 34 um.

Paratype males (n = 2) : L = 1.9-2 mm; a = 35-40; b = 4.3-4.7; c =58-66; c' = 0.9 - 1.0; T = 57 - 58; spicule 59 um; ventromedian supplements 13; oesophagus 415 - 434 um; expanded part of oesophagus 203 - 213 um; odontostyle 22 um; odontophore 29 um; prerectum 110 - 147 um; rectum 66-69 um; tail 29 - 32 um; ABD 34 um.

Description :

Female : Body slightly ventrally curved upon fixation Cuticle thick, finely transversely striated, 4 um at midbody and about 6 um at tail Lateral chords about 1/4th body width at midbody Lip region continuous, amalgamated and truncate, 16 um wide, 4 um high Amphids stirrup-shaped, apertures 8-9 um, slit-like Odontostyle massive, thick walled, especially at tip, aperture wide, ventral arm bent at middle, 1 3 lip width long Odontophore simple, rod-like Guiding ring 'double', fixed ring located at 13-16 um from anterior end Nerve ring at 147-153 um from anterior end Oesophageal expansion gradual, expanded part muscular and occupying about 49-50% of total oesophageal length Cardia elongate-conoid, 22-31 um long Oesophageal gland nuclei and their orifices located as follows

DO	53 - 55	S_1N_1	66 - 68
DN	55 - 57	S_1N_2	72 - 74
DO-DN	1 8 - 2 3	S_2N	80-82
		S_2O	82-84

Reproductive system amphidelphic, both genital branches equally developed Vulva transverse, opening wide Vagina about one-half corresponding body width deep, distinctly sclerotized, wider at midportion, walls faintly sclerotized Well developed sphincter present at oviduct-uterus junction Uterus tubular, filled with sperms Prerectum 1 5 - 1 6 anal body widths long, shorter than rectum Obscure tongue-like structure observed at prerectum-intestinal junction Rectum more than prerectum length, 1 7-2 anal body widths long Tail 3-3 4 anal body widths long, short-conoid then

elongate with a spike-like tip. A pair of caudal pores present on each side.

Male : Similar to females in general morphology except in having short, bluntly conoid tail without spike-like projection. Spicules dorylaimoid, bulky, arcuate, about 1.7 - 2.0 anal body widths long medially. Lateral guiding pieces about 1/5th of spicule length. Supplements an adanal pair and 13 ventromedians, arranged serially. Prerectum 3.2 - 4.3 anal body widths long, ending within the range of ventromedian supplements. Tongue-like structure obscure at prerectum-intestinal junction. Distance between cloaca and first ventromedian supplement about 60-69 um. Tail short, convex-conoid with rounded terminus, with 4 caudal pores on each side.

Type habitat and locality : Soil around roots of rubusta coffee (***Coffea canephora***) from Aldur, Chikmagalur Distt.

Type material : Collected in May 1993. Holotype female on slide ***Coomansinema alduri*** n. sp. / 1 and paratype female and males on slides ***Coomansinema alduri*** n. sp./2-4.

Relationship : ***Coomansinema alduri*** n.sp. comes closer to *C. oryzae* Ahmad, 1993 in having transverse vulva, long spike-like tail tip, tongue-like structure at prerectum-intestinal junction and in the number and arrangement of ventromedian supplements. It differs from *C. oryzae* in having 'double' guiding ring, higher 'a' value, a longer oesophagus, in the structure and position of vulva, spicule size, in having longer rectum and a shorter prerectum (guiding ring single; a=27-31; oesophagus 403-437 um; vulva with cruciform opening and vagina broad at midportion; V=52-56; spicule 55-56 um; rectum 38-51um; prerectum 61-90 um with a tongue-like structure distinctly present in *C. oryzae*).

COOMANSINEMA DIGITICAUDA N. SP.

(Fig 3)

Measurements :

Holotype female : L = 1 4 mm, a = 28 6, b = 4 5, c = 45 3, c = 1 1, V = 58, G1 = 16, G2 = 15, odontostyle 22 um, odontophore 29 um, oesophagus 318 um, expanded part of oesophagus 149 um, prerectum 85 um, rectum 47 um, tail 32 um, ABD 29 um

Paratype female (n = 1) : L = 1 5 mm, a = 29 2, b = 4 2, c = 46 5, c' = 1 1, V =56, G1 = 15, G2 = 16, odontostyle 22 um, odontophore 32 um, oesophagus 356 um, prerectum 125 um, rectum 44 um, tail 32 um, ABD 29 um

Description :

Female : Body slightly ventrally curved upon fixation Cuticle comparatively thin, 2 um at midbody and 5 um at tail, finely transversely striated Lip region set off by slight depression, lips partially separated Amphids stirrup-shaped, about 8 um wide, apertures slit-like Odontostyle massive, heavily sclerotized especially at tip, ventral arm slightly bent inwardly in middle, 1 5 lip widths long, lumen and aperature wide Guiding ring 'double', fixed ring situated at 12 um from anterior end Odontophore simple, rod-like, 1 3 - 1 4 odontostyle lengths long Expansion of oesophagus abrupt, expanded part occupying about 47 - 48% of total oesophageal length Nerve ring located at 124 -138 um from anterior end Cardia long, conoid, about 21 um long Oesophageal gland nuclei and their orifices located as follows

DO	54 - 55	S_1N_1	67 - 68
DN	59 - 61	S_1N_2	73 - 75
DO-DN	5 - 5 6	S_2N	86 - 87

S_2O 86 - 87

Reproductive system amphidelphic, vulva longitudinal, strongly sclerotized. Vagina about 1/3 body width deep. Uterus a long convoluted tube-like structure without sperms. Sphincter present at oviduct-uterus junction. Oocytes arranged in a single row except at tip. Prerectum about 2.9 - 4.3 anal body widths long. Tongue -like structure not observed at prerectum-intestinal junction. Rectum about 1.5 anal body widths long. Tail short, conoid with a bluntly pointed projection at tip, about 1.1 anal body widths long with a pair of caudal papillae on both sides.

Male : Not found.

Type habitat and locality : Soil around roots of forest trees (unidentified) from Kodagu area.

Type material : Collected in July 1993. Holotype female on slide ***Coomansinema digiticauda*** n.sp./1 and paratype female on slide ***Coomansinema digiticauda*** n.sp./2.

Relationship : ***Coomansinema digiticauda*** n.sp. resembles ***C. dimorphicauda*** Ahmad and Jairajpuri, 1989 in general morphology and tail structure. It also resembles ***C. alduri*** n. sp. in the size of odontostyle, in having 'double' guiding ring and in the position of vulva. From ***C. dimorphicauda*** it differs in having set off lip region with partially separate lips, 'double' guiding ring, longer body, oesophagus, tail, simple and stirrup-shaped amphids, longer odontophore, rectum and prerectum (L = 1.25 mm; a = 25; b = 3.8; c = 29; oesophagus 328 um; lip region continuous, truncate, amalgamated; guiding ring single; amphids duplex; odontophore 24 um; rectum 36 um; prerectum 71 um in ***C. dimorphicauda***).

Further it differs from *C. **alduri*** n. sp. in having shorter tail, oesophagus, a, c, c' values, shorter rectum, longer prerectum, in the size and structure of vulva (tail 82 - 118 um; oesophagus 445 - 457 um; a = 35 - 38; b = 4 1 - 4.5, c = 17 - 21; c' = 2.9 - 3.4; rectum 59 um; prerectum 51.5 - 55 um; vagina large, wider at midportion and vulva transverse in *C. **alduri*** n. sp.).

FAMILY APORCELAIMIDAE HEYNS, 1965

Diagnosis : (After Jairajpuri and Ahmad, 1992). Medium to large-sized nematodes Cuticle thick, smooth or finely transversely striated, often with criss-cross lines or punctations and usually with numerous body pores Lip region set off by a constriction Amphids usually with sclerotized median support, fovea often duplex Odontostyle either axial and with wide aperture or with 'mural tooth' set on the ventral wall of the pharynx Guiding sheath without sclerotized fixed ring, anterior margin often plicated Basal enlarged portion of oesophagus highly muscular, usually with prominent glandular tubules obscuring gland nuclei Cardia well developed, cardiac disc or cardiac glands sometimes present Female reproductive system amphidelphic Vulva transverse, longitudinal or pore-like Males with dorylaimoid spicules, lateral guiding pieces and spaced ventromedian supplements Tails short, bluntly rounded or conoid, sometimes filiform, similar in sexes

Type subfamily :

Aporcelaiminae Heyns, 1965

Other subfamilies :

Sectonematinae Siddiqi, 1969

Paraxonchiinae Dhanachand and Jairajpuri, 1981

SUBFAMILY APORCELAIMINAE HEYNS, 1965

Diagnosis : (After Khan *et al.* 1994). Cuticle thick, often marked with criss-cross lines or punctations. Lip region continuous or set off by slight depression. Odontostyle with wide lumen and aperture, guiding ring simple, plicated. Odontophore simple, rod-like. Oesophageal expansion gradual. DN usually far from DO. First pair of subventrals widely separated. Cardia usually with a disc. Female reproductive system amphidelphic. Vulva transverse, longitudinal or pore-like. Males with dorylaimoid spicules, lateral guiding pieces and spaced ventromedian supplements. Tails short conoid or long filiform, similar in sexes.

Type genus :

Aporcelaimus Thorne and Swanger, 1936

Other genera :

Aporcelaimellus Heyns, 1965

Makatinus Heyns, 1965

Takamangi Yeates, 1967

Torumanawa Yeates, 1967

Aporcelaimium Loof and Coomans, 1970

Akrotonus Thorne, 1974

Tubixaba Monteiro and Lordello, 1980

Aporcedorus Jairajpuri and Ahmad, 1983

GENUS *APORCEDORUS* JAIRAJPURI AND AHMAD, 1983

The genus ***Aporcedorus*** was established by Jairajpuri and Ahmad (1983) to accommodate a species, ***A. filicaudatus*** having long body, cuticle with fine striations, oral opening a dorsoventral slit, guiding ring single and plicated, amphidelphic gonads and long filiform tails in both the sexes Another species, ***A. punctatus*** was described by Khan, Ahmad and Jairajpuri (1994) In the present study the soil samples collected from Karnataka yielded ***A. punctatus*** which is mentioned below

Diagnosis : (After Khan ***et al.*** 1994) Body large Cuticle with fine tranverse stiations Oral opening a dorsoventral slit Lip region set off by constriction, lips conoid Amphids stirrup-shaped with slit-like apertures Guiding ring single, plicated, fold-like Odontophore simple, rod-like Oesophagus dorylaimoid, enlarging near middle to form basal expanded part Cardiac disc present Reproductive system amphidelphic Vulva a transverse slit Males with dorylaimoid spicules, lateral guiding pieces and a single, very weakly developed ventromedian supplement and an adanal pair Tails very long filiform, similar in both sexes

Type species :

Aporcedorus filicaudatus Jairajpuri and Ahmad, 1983

Other species :

Aporcedorus punctatus Khan, Ahmad and Jairajpuri, 1994

Remarks : Andrássy (1988) placed ***Aporcedorus*** under the subfamily Laimydorinae but Jairajpuri and Ahmad, 1992 had placed it under

Aporcelaiminae The views of Jairajpuri and Ahmad, (1992) have been accepted in the present work mainly because of the odontostyle structure and the presence of cardiac disc

APORCEDORUS PUNCTATUS KHAN, AHMAD AND JAIRAJPURI, 1994

Measurements :

Female (n = 2) : L = 2 1 - 2 7 mm, a = 51 - 61, b = 5 9, c = 4 6 - 5 5, c' = 18 3 - 18 7, V = 45 5 - 48, G1 = 7 - 11, G2 = 8 - 9, oesophagus 356 - 456 um, expanded part of oesophagus 175 - 221 um, nerve ring 135 - 162 um, odontostyle 13 - 16 um, odontophore 31 - 32 um, guiding ring 7 um, amphids 6 - 7 um, cardia 10 um, prerectum 137 - 147 um, rectum 36 - 37 um, tail 459 - 491 um, ABD 25 - 29 um

Male (n = 1) L = 2 4 mm, a = 58 2, b = 5, c = 4 7, c' = 16 7, T = 43, spicule 51 5 um, lateral guiding pieces 16 um, ventromedian supplement 1, oesogphagus 478 um, expanded part of oesophagus 265 um, nerve ring 154 um, odontostyle 15 um, odontophore 31 um, guiding ring 9 um, cardia 16 um, prerectum 96 um, rectum 48 5 um, tail 515 um, ABD 31 um

Habitat and locality : Soil around roots of pepper plants (***Piper nigrum***) from Sampigekan Estate, Karnataka State

Remarks : The present specimens conform well with the description and measurements of *A. **punctatus*** by Khan ***et al.*** (1994), except in having obscure punctations on the body cuticle, longer prerectum in females and shorter prerectum in male (punctations distinct, prerectum in females 74-83 um and in males 152 um in the type specimens)

SUBFAMILY SECTONEMATINAE SIDDIQI, 1969

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body large and robust Cuticle thick with criss-cross lines. Lip region distinctly set off, liplets separate 'Mural tooth' set on the ventral wall of pharynx. Cardiac disc usually conspicuous Female reproductive system amphidelphic Males with dorylaimoid spicules and irregularly arranged ventromedian supplements Tails short conoid to hemispheroid, similar in sexes.

Type genus :

Sectonema Thorne, 1930

GENUS *SECTONEMA* THORNE, 1930

Thorne (1930) established the genus ***Sectonema*** with ***S. ventrails*** as its type species. ***Sectonema*** is the only genus in the subfamily Sectonematinae Specimens of ***Sectonema*** have large body, mural tooth set on ventral wall of pharynx, amphidelphic gonads and tails short, conoid to hemispheroid, similar in sexes. This genus is represented by about 22 species. In the present study the soil samples collected from Malnad tracts of Karnataka yielded a known species of ***Sectonema*** which turned out to be ***S. procta*** Jairajpuri and Baqri, 1966

Diagnosis : (After Jairajpuri and Ahmad, 1992). Large-sized nematodes Cuticle thick with criss-cross lines. Lip region set off, liplets separate 'Mural tooth' attached to the ventral wall of pharynx. Cardiac disc present. Female reproductive system amphidelphic. Tails short conoid to hemispheroid, similar in sexes.

Type species :

Sectonema ventrale Thorne, 1930.

Other species :

S. anisonchum Siddiqi, 1984

S. balbatum Heyns, 1965

S. brevicauda Heyns, 1965

S. basilgoodeyi Heyns, 1965

S. barbatoides Heyns, 1965

S. demani Altherr, 1965

S. heynsi Altherr, 1968

S. macbethi Heyns, 1965

S. macrospiculum (Altherr, 1958) Heyns, 1958

S. mucrodens Siddiqi, 1984

S. paramonovi (Eliava, 1966) Eliashvili Aliev and Eliava, 1977

S. procta Jairajpuri and Baqri, 1966

S. pseudoventrale Heyns, 1965

S. rotundicauda Goodey, 1951

S. sica Clark, 1964

S. transsylvanicum Popovici, 1978

S. truxum Siddiqi, 1984

S. moderatum Siddiqi, 1995

S. deltatum Siddiqi, 1995

S. amazonicum Siddiqi, 1995

S. conicaudatum Siddiqi, 1995

SECTONEMA PROCTA JAIRAJPURI AND BAQRI, 1966

Measurements :

Females (n = 3) : L = 4.8 - 5.1 mm; a = 59 - 63; b = 5.23-5 51; c = 111- 114, V = 53 - 56; G1 = 9-10; G2 9 - 10; oesophagus 910 - 980 um; expanded part of oesophagus 591 - 658 um; 'mural tooth' 8 um; nerve ring 208 - 224 um, cardia 13 - 16 um; cuticle at midbody 3 - 4 um; cuticle at tail 9 um, prerectum 260-280 um; rectum 57-79 um; tail 44-45 um; ABD 60-62 um

Male : Not found.

Habitat and locality : Soil around roots of robusta coffee (*Coffea canephora*) from Chettalli.

Remarks : The present specimens conform well with the original dimensions and description of *Sectonema procta* Jairajpuri and Baqri, 1966 except in having slightly higher 'a' value, smaller 'mural tooth', thinner cuticle and shorter rectum (a = 56-57; mural tooth 13-15um; cuticle at midbody 5-7 um, cuticle on tail 12-16 um; and rectum 80-100 um in the type specimens).

FAMILY QUDSIANEMATIDAE JAIRAJPURI, 1965

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle smooth or finely transversely striated Lateral hypodermal chords may be provided with distinct glandular bodies Lip region continuous or set off by a depression or constriction, may be discoid Amphids small to large, with stirrup-shaped fovea Odontostyle cylindrical, dorylaimoid, with distinct lumen and aperture Guiding ring single or 'double' Odontophore rod-like or with sclerotized basal flanges or knobs Expanded part of oesophagus about one-half oesophageal length Cardia hemispheroid or elongate-conoid Cardiac disc present or absent. Vulva transverse or longitudinal Female reproductive system mono-opisthodelphic or amphidelphic. Males with spicules and lateral guiding pieces Ventromedian supplements few to numerous, spaced or contiguous Tails short, hemispheroid to elongate-conoid, similar in sexes

Type subfamily :

Qudsianematinae Jairajpuri, 1965

Other subfamilies :

Thorniinae De conink, 1965

Discolaiminae Siddiqi, 1969

Lordellonematinae Siddiqi, 1969

Crateronematinae Siddiqi, 1969

Chrysonematinae Siddiqi, 1969

Hulqinae Siddiqi, 1982

SUBFAMILY DISCOLAIMINAE SIDDIQI, 1969

Diagnosis : (After Andrássy, 1990). Medium to large-sized nematodes. Cuticle smooth with numerous lateral-sublateral pores leading to large glandular cells. Labial region often expanded, discoid or sucker-like, rarely with a sclerotized inner plate. Oral opening large, hexagonal. Spear short with large aperture. Guiding ring simple, orifice of dorsal oesophageal gland nucleus lying well behind the expansion zone, first pair of subventral nuclei conspicuous. Vulva transverse, vagina not sclerotized. Female genital organ amphidelphic or rarely, opisthodelphic. Ventromedian supplements spaced. Tails in both sexes similar, short, conoid or rounded.

Type genus :

Discolaimus Cobb, 1913.

Other genera :

Discolaimium Thorne, 1939

Discolaimoides Heyns, 1963

Latocephalus Patil and Khan, 1982

Mylodiscus Thorne, 1939

Mylodiscoides Lordello, 1963

Filidiscolaimium Siddiqi, 1995

GENUS *MYLODISCUS* THORNE, 1939

The genus ***Mylodiscus*** was established by Thorne,1939 to accommodate species with set off lip region, cephalic region with inner sclerotized bowl-shaped plate, guiding ring 'double' amphidelphic gonads and short, convex-conoid tail. ***M. nanus*** was proposed as the type species. Males were not known for this genus. Except for the type species, no other species was so far described under this genus. In the present work, soil samples from the Malnad tracts of Karnataka yielded a new species of the genus ***Mylodiscus*** which is described and illustrated.

Diagnosis : (After Andrássy, 1990). Body moderately long, between 1 - 2mm, fairly robust. Cuticle with fine transverse striae. Lateral chords with glands and pores arranged in a single row, 35 on each side of body. Head set off, lips distinct, cephalic region with inner sclerotized bowl-shaped plate. Amphids stirrup-like. Spear simple, shorter than labial width, 10 - 12 um, aperture occupying about 1/5 of spear length. Guiding ring 'double' but thin. Oesophagus enlarged in middle region, dorsal nucleus lying far from zone of expansion. Vulva transverse, not sclerotized. Female reproductive system amphidelphic. Tail shorter than anal body diameter, rounded. Males unknown.

Type species :

Mylodiscus nanus Thorne, 1939

Other species :

M. parananus n.sp.

MYLODISCUS PARANANUS N. SP.

(Fig. 4)

Measurements :

Holotype female : L = 1.6 mm; a = 38.7; b = 4.1, c = 79, V = 59, G1 = 12, G2 = 13, odontostyle 13 um, odontophore 22 um, oesophagus 381 um, prerectum 106 um; rectum 34 um; tail 20 um, ABD 30 um,

Paratype females (n = 3) : L = 1 1 - 1 6 (1.4 ± 0 25) mm a = 29 - 39 (34 7 ± 5 3); b = 3 3 - 4 5 (3 97 ± 0 61), c = 53 5 - 90 (74 ± 18 87), c' = 0.8 (0.7 ± 0 1); V = 56 - 59 (57 ± 1.65); G1 = 10 - 16 (12 8 ± 3 03), G2 = 10.6 - 13 (12.23 ± 1 41), oesophagus 348 - 381 (363 ± 16 52) um, odontostyle 13 um; odontophore 20-23.5 um, prerectum 90-106 (96 ± 8.93) um; rectum 31 - 34 (32 ± 1.47) um; tail 18 - 21 (19 6 ± 1 85) um; ABD 30 um.

Description :

Female : Body ventrally curved upon fixation, tapering slightly towards extremities Cuticle finely striated, 2 5 um thick at midbody, 6 um in tail region. Lateral chords about 1/5 - 1/6 body width at midbody. Lateral body pores not observed Lip region disc-like, set off by deep constriction, bearing cuticularised shallow bowl-like plate with radiating ridges. Amphids stirrup-shaped with slit-like apertures, about 5-6 um wide Odontostyle slender 12 - 13 um long, lumen wide, dorsal arm lower than ventral, aperture distinctly wider, about 1/2 of odontostyle length. Odontophore simple, rod-like, 20 - 24 um or twice as long as odontostyle. Guiding ring 'double', fixed ring situated at about 7 um from anterior end. Anterior part of oesophagus

occupying about 46 - 48% of total oesophageal length, expansion abrupt Nerve ring situated at 115 - 125 um from anterior end Cardia short 7 - 9 um long, bluntly conoid. Nerve ring situated at 115-125 um from anterior end Location of dorsal oesophageal gland nuclei and their orifices as follows

DO	63-64	S_1N_1	76-78
DN	67-68	S_1N_2	80-81
DO-DN	3 8-4 1	S_2O	88-89

DO 42-44 um behind the point of expansion and S_1N_1 located at 32-34 um below DN

Female reproductive system amphidelphic Vulva transverse, vagina about one-half body width deep, faintly sclerotized Body wall thickened at vulva-vagina junction. Uterus a long tubular structure without sperms Distinct sphincter present at oviduct-uterus junction Ovary with few oocytes arranged in a single line except at distal end. Prerectum 90 - 106 um or 3 - 3 5 anal body widths long, rectum 31 - 34 um or about 1 1 anal body widths long Tail short, convex-conoid, less than one anal body width long, single caudal papilla on each side.

Male : Not found.

Type habitat and locality : Soil around roots of tree coffee (***Coffea excelsa***) from CRS farm, Chikmagalur Distt.

Type material : Collected in May 1993. Holotype female on slide ***Mylodiscus parananus*** n sp /1 and paratype females on slides ***Mylodiscus parananus*** n.sp./2-3

Relationship : ***Mylodiscus parananus*** n.sp. distinctly differs from ***M. nanus*** Thorne, 1939 in the odontostyle structure and aperture size, anteriorly located guiding ring, lack of lateral body pores, greater a, c values, shorter tail and longer prerectum.(odontostyle with both the arms at same level, aperture about 1/5th odontostyle length; lateral body pores 35 on each side, a = 24 - 29; c = 46 - 72; tail = 20-25 um, guiding ring 8-12 um, prerectum 67-96 um in ***M. nanus***).

SUBFAMILY LORDELLONEMATINAE SIDDIQI, 1969

Diagnosis : (Emended). Cuticle tylencholaimoid. Somatic musculature apparently meromyrian. Body pores usually distinct, leading to prominent cuticularised ducts. Lip region set off by constriction or narrowing. Odontostyle dorylaimoid, with wide lumen and aperture. Odontophore simple, rod-like. Guiding ring single or 'double'. Cardiac disc present or absent. Anterior pair of subventral glands widely separated from each other, anterior one being closer to dorsal gland. Female reproductive system monodelphic or amphidelphic. Males very rare. Spicules with or without median stiffening piece. Tails short, conoid to elongate-conoid; similar in sexes.

Type genus :

Lordellonema Andrássy, 1960

Other genera :

Poronemella Siddiqi, 1969

Moshajia Siddiqi, 1982

Sicorinema Siddiqi, 1982

Neolordellonema N. Gen.

GENUS *NEOLORDELLONEMA* N.GEN.

During the course of the present study one of the soil samples collected from Karnataka yielded a female specimen which upon detailed study was found to represent a new genus for which the name ***Neolordellonema nivethi*** n.gen., n.sp. is proposed. The new genus is characterized by coarsely

annulated inner cuicle, distinct pattern of body pores, amphidelphic gonads and a short, convex-conoid tail.

Diagnosis : Body small-sized, cylindroid, tapering at extremities. Cuticle tylencholaimoid, outer cuticle smooth, inner cuticle coarsely annulated. Lateral hypodermal chords with glandular structures Lateral, dorsal and ventral body pores distinct, leading through canals into hypodermis Lips high, set off by narrowing, partially separated, rounded. Odontostyle strongly sclerotized with broad lumen and distinct aperture. Odontophore simple, rod-like, weakly sclerotized, as long as odontostyle Guding ring 'double' Amphids funnel-shaped. Dorsal oesophageal gland nucleus posterior to orifice. Cardia short, bluntly conoid. Cardiac disc absent. Female reproductive system amphidelphic. Vulva post-equatorial, longitudinal, small, distally sclerotized with plate-like pieces. Tail short, convex-conoid

Type and only sepcies :

Neolordellonema *nivethi* n.sp.

Relationship : The new genus ***Neolordellonema*** is distinctive in having a definite pattern of body pores, 'double' guiding ring, absence of cardiac disc, longitudinal vulva, absence of scale like structures at posterior extremity and short, convex-conoid tail. In the general body shape, presence of body pores and in the cuticle structure ***Neolordellonema*** resembles ***Lordellonema*** Andrássy, 1960 and ***Poronemella*** Siddiqi, 1969 but differs from them in having longitudinal vulva, partly separated lips, distinct pattern of body pores, absence of cardiac disc and 'double' guiding ring The vulva is transverse, lips are separate, the cardiac disc is present, guiding ring is single in ***Lordellonema*** In ***Poronemella*** the vulva is pore-like, gonad mono-prodelphic, guiding ring is single and tail is elongate-conoid.

NEOLORDELLONEMA NIVETHI N. SP.

(Fig. 5)

Measurements :

Holotype female : L = 0.74 mm; a = 2.9; b = 3.2; c = 50; V = 61; G1 = 12.6; G2 = 9.6; odontostyle 13 um; odontophore 13 um, oesophagus 229 m; prerectum 36 um; rectum 25 um; tail 15 um; ABD 18 um.

Description :

Female : Body short, about 0.74 mm long, cylindroid, tapering at extremities, slightly ventrally curved upon fixation. Outer cuticle smooth, inner cuticle coarsely annulated, 0.75 um at midbody and 2 um on tail. Lateral hypodermal chords with glandular bodies about 1/3rd body width wide. Body pores distinct, with a distinct pattern of arrangement. Dorsal pores two in anterior portion and two on tail. Ventral pores 9 before oesophago-intestinal junction and 3 posteriorly. Lateral pores arranged in single row up to oesophageal expansion, about 10 in numbers and after the expansion arranged in two rows; dorsally there are 19 pores and on the ventral side 27 pores are present. Lip region set off by narrowing, high, partially separated, rounded, papillae slightly raised, 9 um wide and 3 um high. Amphids funnel-shaped, apertures about 6.5 um wide, slit-like. Odontostyle strongly sclerotized, distinctly longer than lip width with aperture about 1/4 of its length. Lumen of odontostyle about 2 um wide. Odontophore simple, rod-like about as long as odontostyle, weakly sclerotized. Guiding ring 'double'. Nerve ring located at 79 um from anterior end. Expanded part of oesophagus occupying about 42% of total oesophageal length. Expansion gradual. Cardia bluntly conoid, about

1/3 body width long. Cardiac disc absent. Oesophageal gland nuclei and their orifices are located as follows :

DO	61.54	S_1N_1	69.8
DN	65.4	S_1N_2	81.98
DO-DN	3.84	S_2N/O	91.9

Female reproductive system amphidelphic. Vulva longitudinal, very small. Vulva-vagina junction with plate-like distinct cuticular pieces. Egg about 3.5 body widths long and one body width wide, cylindroid. Ovaries small, uterus-oviduct not differentiated. Prerectum short, about 2 anal body widths long. Rectum about 1.4 anal body widths long. Tail short, less than one anal body width long, convex-conoid, inner cuticle distinctly smooth and shrunken. Caudal papillae distinct, two on each side.

Male : Not found.

Type locality : Soil around roots of paddy (***Oryza sativa***) from Muthinakoppa, Karnataka.

Type material : Collected in July 1993. Holotype female on slide ***Neolordellonema nivethi*** n. gen., n.sp./1.

FAMILY NORDIIDAE JAIRAJPURI AND SIDDIQI, 1964

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body medium to large-sized. Cuticle finely striated. Lip region continuous or set off by depression or constriction; lips amalgamated or well separated; labial papillae often raised or setiform. Amphids with stirrup-shaped fovea and slit-like apertures. Odontostyle slender, attenuated, long with narrow lumen and aperture. Guiding ring distinct, single or 'double'. Odontophore elongate, rod-like or with basal swellings or flanges. Oesophagus muscular, expanding posterior to mid-length. Vulva transverse; vagina usually distally sclerotized. Female reproductive system mono-opisthodelphic or amphidelphic. Tails similar in sexes; hemispherical to long, filiform.

Type subfamily :

Nordiinae Jairajpuri and A.H. Siddiqi, 1964

Other subfamilies :

Cephalodorylaiminae Jairajpuri, 1967

Pungentinae Siddiqi, 1969

Helmabiinae Siddiqi, 1971

Actinolaimoidinae Jairajpuri and Ahmad, 1992

SUBFAMILY CEPHALODORYLAIMINAE JAIRAJPURI, 1967

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body slender, medium-sized. Lip region continuous with body. Inner labial papillae enlarged, sometimes setiform. Amphids with large stirrup-shaped fovea and slit-like apertures. Odontostyle greatly attenuated, its aperture minute and obscure. Odontophore

rod-like. Guiding ring single. Female reproductive system mono-opisthodelphic or amphidelphic. Spicules arcuate, lateral guiding pieces present and ventromedian supplements spaced.

Type genus :

Cephalodorylaimus Jairajpuri, 1967

Other genera :

Acephalodorylaimus Ahmad and Jairajpuri, 1982

Echinodorus Siddiqi, 1995

GENUS *CEPHALODORYLAIMUS* JAIRAJPURI, 1967

The genus *Cephalodorylaimus* was established by Jairajpuri in 1967 to accommodate dorylaims with a long, narrow body, inner cephalic papillae greatly elongated, 'setae-like', much attenuated spear, amphidelphic gonads and ventrally arcuate, elongate-conoid tail. *C. papillatus* Jairajpuri, 1967 the type species of the genus which was collected from the soil samples from Malnad tracts is reported below.

Diagnosis : (After Jairajpuri, 1967). Body slender. Lip region narrow, conoid. Inner liabial papillae greatly enlarged, setiform; outer labial and cephalic papillae also enlarged but papilliform. Amphids large with stirrup-shaped fovea and slit-like apertures. Odontostyle long, attenuated. Guiding ring single. Odontophore rod-like. Basal expanded part of oesophagus occupying nearly one-half total oesophageal length. Vulva transverse. Female reproductive system amphidelphic. Males with arcuate spicules and lateral guiding pieces. Ventromedian supplements spaced, beginning within spicular range. Tails elongate-conoid, ventrally arcuate; similar in sexes.

Type species :

Cephalodorylaimus papillatus Jairajpuri, 1967

Other species :

C. cephalatus Siddiqi, 1995

CEPHALODORYLAIMUS PAPILLATUS JAIRAJPURI, 1967

Measurements :

Females (n = 4) : L = 1 1-1 5 (1 3 ± 0 2) mm, a = 46-59 (52 9 ± 6 2), b = 4 3-4 5, c = 9-10 (9 5 ± 0 7), V = 46 - 49 (47 5 ± 1 5), G1 = 15-18, G2 = 15-18, odontostyle 13-16 um, odontophore 13-18 um, guiding ring 6-12 um, oesophagus 254-337 (294 ± 41) um, expanded part of oesophagus 103-162 (129 ± 30) um, nerve ring 107-124 (116 ± 8 2) um, cardia 5-9 um, prerectum 68-99 (80 ± 16 4) um, rectum 22-27 (25 ± 2 8) um, tail 121-147 (138 ± 13 7) um, ABD 16-18 um

Male (n = 1) : L = 1 3 mm, a = 60 5, b = 5 1, c = 10 3, c' = 6 8, T = 44, spicule 32 um, lateral guiding pieces 10 um, ventromedian supplements = 7, odontostyle 15 um, odontophore 18 um, guiding ring 9 um, nerve ring 113 um, oesophagus 253 um, prerectum 110 um, rectum 23 5 um, tail 125 um, ABD 18 um

Habitat and locality : Soil around roots of cardamom plants (***Elettaria cardamomum***) from Shanivara Santhe, Hassan Distt

Remarks : The present specimens conform well with ***Cephalodorylaimus papillatus*** Jairajpuri, 1967 except in having shorter expanded part of oesophagus, slightly longer spicules and prerectum in males (expanded part of oesophagus about 50% vs 41-48%, spicules 26-30 um and prerectum in males 68-79 um in the type specimens)

SUBFAMILY PUNGENTINAE SIDDIQI, 1969

Diagnosis : (After Jairajpuri and Ahmad, 1992) Small to medium-sized nematodes. Cuticle finely striated. Radial striations and saccate bodies may be present. Body pores indistinct Lip region continuous or set-off by constriction, labial papillae distinctly visible Cuticularised pieces may be present around oral aperture. Amphids with stirrup-shaped fovea and slit-like apertures, labial or post-labial in position. Odontostyle small to very long (about 8-70 um), with narrow lumen and aperture. Guiding ring single or 'double' Odontophore rod-like, usually with small knobs or broad flanges. Oesophagus expanding beyond its middle. Cardia hemispherical or elongate. Vulva transverse Female reproductive system usually amphidelphic, rarely mono-opisthodelphic Spicules arcuate, lateral guiding pieces present and ventromedian supplements 4-12, spaced. Tails hemispheroid to long filiform, similar in sexes.

Types genus :

Pungentus Thorne and Swanger, 1936

Other genera :

Enchodelus Thorne, 1939

Kochinema Heyns, 1963

Lenonchium Siddiqi, 1965

Rhyssocolpus Andrássy, 1971

Enchodorus Vinciguerra, 1976

Californidorus Robbins and Weiner, 1978

GENUS *LENONCHIUM* SIDDIQI, 1965

The genus ***Lenonchium*** was established by Siddiqi (1965) to accommodate those specimens of dorylaims with attenuated odontostyle, simple rod- like odontophore with faint basal swellings, amphidelphic gonads and long filiform tails in both sexes. ***L. oryzae*** was proposed as the type species. Jairajpuri (1967) added more data on ***L. oryzae*** and transferred ***Dorylaimoides longidens*** Furstenberg and Heyns, 1966 to ***Lenonchium***. Siddiqi (1969) transferred ***Dorylaimus denticaudatus*** Imamura, 1931 under ***Lenonchium*** but since this species is poorly described, its position is doubtful. Ahmad and Jairajpuri (1988) added ***L. macrodorum*** and Swart and Heyns (1991) proposed another species ***L. fimbricaudatum*** to this genus. Swart and Heyns (1991) have also provided a key to the species of ***Lenonchium.***

Siddiqi (1969) placed ***Lenonchium*** under Thornenematidae but Ferris (1971) placed it under Dorylaimidae. A new subfamily, Lenonchinae under the family Nordiidae was proposed by Eliava (1978). Ahmad and Jairajpuri (1988) accepted the placement of ***Lenonchium*** under Nordiidae. In the present work, two new species collected from soil samples of Karnataka state are described and illustrated.

Diagnosis : (Emended). Body small to medium-sized, cuticle finely transversely striated, subcuticle often loose. Lip region either continuous with body or set off by a slight depression. Amphids wide, stirrup-shaped or bilobed. Odontostyle long, attenuated with fine lumen and distinct aperture. Guiding ring single or 'double'. Odontophore rod-like, basal region swollen, muscular. Expanded part

of oesophagus occupying about half of total oesophageal length, expansion gradual. DO close to beginning of oesophageal expansion, S_1N widely separated and S_1N_2 well developed. Cardia conoid. Vulva transverse or longitudinal. Female reproductive system amphidelphic. Males with well developed spicules, lateral guiding pieces and series of mammiform ventromedian supplements Tails long filiform, similar in sexes, tip usually mucronate with more than two finger like projections.

Type species :

Lenonchium oryzae Siddiqi, 1965

Other species :

L. fimbricaudatum Swart and Heyns, 1991

L. longidens (Furstenberg and Heyns, 1966) Jairajpuri, 1967

L. macrodorum Ahmad and Jairajpuri, 1988

L. anamicus n.sp.

L. singulatus n.sp.

Species inquirenda :

L. denticaudatus (Imamura, 1931) Siddiqi, 1969

LENONCHIUM ANAMICUS N.SP.

(Fig. 6)

Measurements :

Holotype female : L = 2.8 mm; a = 53 5; b = 5.9; c = 8.5; c' = 10.8; V = 49; G1 = 21.4; G2 = 21.4; odontostyle 34 um; odontophore 30 um; oesophagus 463 um; expanded part of oesophagus 260 um; prerectum 287 um; rectum 34 um; tail 323 um; ABD 30 um.

Paratype females (n = 7) : L = 2.6 - 2.9 (2.8 ± 0.1) mm; a = 53 5 - 57.9 (55.7 ± 2.2); b = 5.8-7.4 (6.6 ± 0.8); c = 8.8-10.3 (9.4 ± 0.8); c' = 8 7-11.1 (10 ± 1.2); V = 43-50; G1 = 17.5-20; G2 = 12-19; odontostyle 31-32 um; odontophore 28-32 um; oesophagus 394-448 (422 ± 27.2) um; expanded part of oesophagus 232-257 (248 ± 13) um; prerectum 294-441 (347 ± 82) um; rectum 22-31 um; tail 256-328 (299 ± 38.4) um; ABD 30-31 um.

Paratype Males (n = 5) : L = 2.8-3.1 (3 ± 0.1) mm; a = 56-63.5 (60 4 ± 3 7), b = 6.1-7.0 (6.6 ± 0.4); c = 11.3-14.2 (13 ± 1.3); c' = 5 4-6.5 (6.0 ± 0.4); T = 53-70 (60 ± 7.3); spicule 60-66 um; lateral guiding pieces 10-12 um, ventromedian supplements = 19-25; odontostyle 29-34 um; odontophore 28-32 um; oesophagus 434-465 (450 ± 14.5) um; expanded part of oesophagus 235-279 (258 ± 18) um; prerectum 206-456 (355 ± 111) um; rectum 59-74 (62 ± 8.4) um; tail 206-249 (219 ± 217) um; ABD 37-39 um.

Description :

Female : Large sized, about 3 mm long, slightly ventrally arcuate upon fixation, tapering towards extremities. Cuticle finely transversely striated, subcuticle irregular and loose. Lateral hypodermal chords about one-third body width wide at midbody. Lip region almost continuous, rounded, amalgamated, about 13 um wide. Amphids distinctly bilobed, about 9 um wide, sensillar pouches near base of odontostyle. Odontostyle attenuated, about 2.3-3.5 lip widths longs, lumen narrow, aperture distinct. Odontophore about odontostyle length long, rod-like, basal region distinctly swollen, muscular. Guiding ring 'double', fixed ring located at 18-20 um from anterior end. Nerve ring located at 115-125 um from anterior end. Expanded part of oesophagus about 56-61% of total

oesophageal length. Cardia short, bluntly rounded to conoid. Oesophageal gland nuclei and their orifices are located as follows :

DO	46-47	S_1N_1	69-72
DN	49-50	S_1N_1	78-82
DO-DN	3 - 4	S_2N	93-95
		S_2O	94-96

Reproductive system amphidelphic. Vulva pore-like. Vagina-vulva junction with triangular cuticular pieces. Vagina cylindrical, more than half of corresponding body width deep. Gonads well developed. Uterine sac full of sperms. Distinct sphincter present at oviduct-uterus junction. Eggs cylindroid, more than two body-widths long. Prerectum, about 10-15 anal body widths long. Rectum about one anal body width long. Tail long, filiform, 9-11 anal body widths long, tip always with four finger like projections, caudal pores two on each side.

Male : Similar to females, tail portion more curved. Testes paired, opposed, dorylaimoid. Spicules large, arcuate with well developed, lateral guiding pieces which are bifurcated at the tip. Ventromedian supplements 19-25, and an adanal pair, mammiform, arranged serially. Distance between cloaca and first ventromedian supplement about 39-46 um. Prerectum about 5.4 - 12 anal body widths long. Rectum about 31-39 um. Tail long filiform, tip with four finger like projections, two caudal papillae on each side.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) and grasses (unidentified) from Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Lenonchium anamicus*** n.sp./1 and paratype females and males on slides ***Lenonchium anamicus*** n.sp./2-4.

Relationship : ***Lenonchium anamicus*** n.sp. closely resembles ***L. macrodorum*** Ahmad and Jairajpuri, 1988 and ***L. oryzae*** Siddiqi, 1965. From ***L. macrodorum*** it differs mainly in male characters, viz., lesser 'a' value, greater tail length, in spicule size, number of ventromedian supplements, lateral guiding pieces, lesser odontostyle length in both sexes, pore-like vulva and the vaginal structure in females, location of S_2N and S_2O much near the bottom of oesophagus and structure of amphids (a = 52-71; tail 183-220 um; spicules 59 - 64 um; lateral guiding pieces 15-18 um; ventromedian supplements 20-21; odontostyle 33-35 um; vulva transverse and almost triangular; S_2N = 85-88; S_2O = 86-89 and amphids stirrup-shaped in ***L. macrodorum***). It further differs from ***L. oryzae*** in having longer oesophagus, greater c' value, in spicule size, in having more ventromedian supplements, longer odontostyle, odontophore, shorter prerectum, pore-like vulva and in the structure of amphids (oeosophagus 378-421 um; c' 6-7.8; spicules 51-56 um; ventromedian supplements 17-18; odontostyle 18-20 um; odontophore 20-21 um; prerectum 365 - 385 um; amphids stirrup-shaped and vulva transverse in ***L. oryzae***).

LENONCHIUM SINGULATUS N.SP.

(Fig. 6)

Measurments :

Holotype female : L = 4.2 mm; a = 65.6; b = 8.1; c = 15.4; c' = 6.7; V = 46.3; G1 = 21.3; G2 = 23; odontostyle 28 um; odontophore 30 um;

oeosphagus 525 um, expanded part of oesophagus 334 um, prerectum 478 um, rectum 41 um, tail 275 um, ABD 41 um

Description :

Female : Body long, slightly ventrally arcuate upon fixation Outer cuticle finely transversely striated Inner cuticle loose and irregular Lip region slightly set off by depression, dome-shaped, amalgamated, 18 um wide Amphids distinctly bilobed and duplex, sensillar pouches at the base of odontophore Guiding ring 'double', fixed ring situated at 18 um from anterior end Lateral hypodermal chords about one-third body width wide at midbody Odontostyle attenuated, about 1 6 lip widths long Odontophore slightly more than odontostyle length, rod-like, basal region swollen, muscular Nerve ring located at 132 um from anterior end Expanded part of oesophagus occupying about 64% of total oesophageal length, moderately muscular Cardia short, bluntly rounded

Reproductive system amphidelphic Vulva pore-like, vulva-vagina junction with weakly sclerotized, triangular pieces Vaginal walls faintly sclerotized, cylindrical, vagina about 65% of corresponding body width deep Well developed sphincter present at oviduct-uterus junction Prerectum about 11 6 anal body widths long Rectum about one anal body width long Tail long filiform about 6 7 anal body widths long, tip with 4 finger like projections, caudal papillae two on each side

Male : Not found

Type locality and habitat : Soil around roots of paddy (***Oryza sativa***) near Arvind dairy, Chikmagular Distt

Type material : Collected in March 1993 Holotype female on slide ***Lenonchium singulatus*** n sp /1

Relationship : ***Lenonchium singulatus*** n sp differs from other species in having relatively longer body It comes closer to ***L. fimbricaudatum*** Swart and Heyns, 1991 in general body structure but differs distinctly in having comparatively shorter body, greater body width, lesser a, b, c, values, higher c' value and longer tail (L = 5 4-6 3 mm, body width 56 5-62 5 vs 65 um, a = 89 1-103 7, b = 10 4-12 0, c = 25 3-33, c' = 4 4-6 3, tail 163 5-232 um in ***L. fimbricaudatum***)

SUPERFAMILY ACTINOLAIMOIDEA THORNE, 1939

The subfamily Actinolaiminae was established under Dorylaimidae by Thorne (1939) for those species with sclerotized vestibule with or without four onchia He included the genera ***Actinolaimus*** Cobb, 1913, ***Mylodiscus*** Thorne, 1939 and ***Carcharolaimus*** Thorne, 1939 under it. Later in 1957, Meyl splitted the genus ***Actinolaimus*** and proposed three genera, viz , ***Paractinolaimus***, ***Metactionolaimus*** and ***Actinolaimoides*** based on the structure and arrangement of onchia and mural denticles He (l.c) raised the subfamily to familial rank in the year 1961 The genus ***Brasilaimus*** Lordello and Zamith (1957) was synonymised with ***Actinolaimus*** by Clark (1961) while Thorne (1967) considered it a ***genus inquirendum***. Andrássy (1976) accepted Lordello and Zamith's (1957) proposal as valid. Goodey (1963) considered Actinolaimidae as a subfamily under Dorylaimidae with eight genera. But Lordello (1963, 1967) regarded Actinolaimidae as a valid family and established ***Mylodiscoides*** and ***Caryboca*** with a new genus ***Trachactinolaimus***. In 1964 he (l c) proposed a new genus ***Actinca***.

The whole group was raised to superfamilial rank by Thorne (1967) with six families, viz , Actinolaimidae, Neoatinolaimidae, Paractinolaimidae, Carcharolaimidae, Trachypleurosidae and Mylodiscidae and also proposal of six new genera, viz , ***Brittonema, Actinocephalus, Egtitus, Neoactinolaimus, Westindicus, Caribenema*** and ***Carcharoides***. The genus ***Stomachoglossa*** was established by Andrássy (1968) and he placed it along with ***Actinca*** in the

subfamily Actincinae. Heyns and Argo (1969) synonymised ***Egtitus*** with ***Neoactinolaimus***. ***Mactinolaimus*** was proposed by Andrássy (1970) under Neoactinolaimidae, ***Afractinolaimus*** was kept under Paractinolaimidae and Brittonematinae was raised to familial rank.

In 1973, Yeates described ***Hexactinolaimus*** under Neoactinolaimidae ***Nothactinolaimus*** was described by Loof (1973). Baqri ***et al.*** (1975) considered that the actinolaimid nematodes belong under the superfamily Dorylaimoidea They (l c) doubted the validity of ***Afractinolaimus*** Actinolaimoidea was accepted as a valid superfamily by Andrássy (1976) with four families, viz , Actinolaimidae, Brittonematidae, Trachypleurosidae and Carcharolaimidae ***Nothactinolaimus*** was synonymised to ***Egtitus*** by Andrássy the same year The genus ***Actinolaimoides*** was transferred to Nordiidae by Siddiqi (1981) ***Afractinolaimus*** and ***Egtitus*** were considered as valid genera by Vinciguerra and Heyns (1984). Coomans and Loof (1986) lowered Brittonematidae to subfamilial rank and ***Brittonema*** was considered a synonym of ***Actinca.*** Vinciguerra (1987) revised the whole group and placed Actinolaimidae under the superfamily Dorylaimoidea with three subfamilies, viz., Actinolaiminae, Hexactinolaiminae and Trachypleurosinae. She (l.c.) also provided a key for the genera and listed all known species with comments on phylogeny of the group Tracyhpleurosinae was synonymised with Actinolaiminae by Coomans, Vinciguerra and Loof (1990) and ***Hexactinolaimus*** was synonymised with ***Paractinolaimus*** by Vinciguerra and Coomans (1991). Jairajpuri and Ahmad (1992) accepted Actinolaimoidea as a superfamily and proposed only three families, viz , Actinolaimidae, Carcharolaimidae and Trachypleurosidae

Khan and Jairajpuri (1994) have considered only two families, viz., Actinolaimidae and Carcharolaimidae under Actinolaimoidea. Andrássy (1990) while reviewing the superfamily Dorylaimoidea regarded Carcharolaiminae as a subfamily under Qudsianematidae Jairajpuri, 1965.

In the several soil samples collected and analysed from Malnad, only few samples had actinolaim nematodes. This may be an indication that this group has a limited distribution and their population levels are rather low.

Diagnosis : (Emended). Lip region with sclerotized pharyngeal walls varying from simple plates to strong refractive basket-like or ribbed structures, frequently accompanied by 4 large onchia which may be fused into a spear guide or by numerous mural denticles. Cuticle often with longitudinal striations. Odontostyle simple, dorylaimoid with distinct dorsal aperture. Odontophore simple, rod-like. Oeosophagus enlarged near middle, anterior part either with well developed radial musculature or a slender non-muscular tube. Strong basal shield usually present at base of oesophagus. Female reproductive system amphidelphic, very rarely mono-opisthodelphic. Males with dorylaimoid spicules, lateral guiding pieces and supplements. Tails elongate-conoid to long filiform; similar or dissimilar in sexes.

Type family :

Actinolaimidae Thorne, 1939

Other family :

Carcharolaimidae Throne, 1967

FAMILY ACTINOLAIMIDAE THORNE, 1939

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body cylindroid; lip region continuous or set off by constriction or expansion. Cuticle often with longitudinal striae formed by grooves or furrows. Vestibule with four massive onchia with or without denticles. Odontostyle dorylaimoid, with distinct aperture. Expanded part of oesophagus about one-half of oesophageal length. Basal shield at base of oesophagus present or absent. Vulva transverse, longitudinal or pore-like. Female reproductive system mono-opisthodelphic or amphidelphic. Males with dorylaimoid spicules, lateral guiding pieces and ventromedian supplements arranged in series or grouped in two or three fascicles. Tails elongate-conoid to long filiform; similar or dissimilar in sexes.

Type subfamily :

Actinolaiminae Thorne, 1939

Other subfamilies :

Paractinolaiminae Thorne, 1967

Brittonematinae Thorne, 1967

SUBFAMILY ACTINOLAIMINAE THORNE, 1967

Diagnosis : (After Jairajpuri and Ahmad 1992). Cuticle marked with fine transverse striations, longitudinal striations may be present or absent. Lateral fields with two rows of cells with minute pores. Vestibule armed with four massive onchia, mural denticles absent. Odontostyle large, aperture about one-third to one-half of its length. Post-extension constriction of oesophagus

present or absent. Basal shield of oesophagus may or may not be present. Female reproductive system mono-opisthodelphic or amphidelphic. Males with dorylaimoid spicules, lateral guiding pieces present, ventromedian supplements in series or in fascicles. Female tail elongate to filiform. Male tail short, obtusely rounded or long filiform.

Type genus :

Actinolaimus Cobb, 1913

Other genera :

Neoactinolaimus Thorne, 1967

Egtitus Thorne, 1967

Mactinolaimus Andrássy, 1970

Metactinolaimus Meyl, 1957

Trachypleurosum Andrássy, 1959

Scleroactinolaimus Ahmad, Khan and Ahmad, 1992

GENUS *NEOACTINOLAIMUS* THORNE, 1967

The genus ***Neoactinolaimus*** was proposed by Thorne (1967) to accommodate those species with transverse striations on cuticle but without longitudinal ridges, vestibule with four large onchia devoid of denticles, post-extension constriction of oesopahgus and ventromedian supplements arranged in groups (fascicles). ***Neoactinolaimus agilis*** was proposed as the type species. Nine species of ***Actinolaimus*** were transferred to ***Neoactinolaimus*** by Thorne (1967). Heyns and Argo (1969) have described two more species to ***Neoactinolaimus*** while Andrássy (1970) proposed a new genus ***Mactinolaimus***

which was not considered as a valid genus by Baqri *et al.* (1975). Chaturvedi and Khera (1979), Gagarin (1979), Khan *et al.* (1994) added several species to ***Neoactinolaimus***. Vinciguerra (1987) revalidated ***Mactinolaimus*** and restricted only those species which possess additional teeth on onchia and ventromedian supplements are arranged in fascicles under ***Neoctinolaimus***. In the present work, a new species of ***Neoactinolaimus*** was collected from the Malnad tracts and the same is described and illustrated.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body cylindroid except at extremities. Cuticle marked with only minute transverse striations. Vestibule armed with four large onchia and each onchia is provided with a secondary tooth. Odontostyle dorylaimoid with distinct aperture, about one half to two-fifths of its length. Guiding ring 'double'. Odontophore simple, rod-like, weakly sclerotized. Post-extension constriction of oesophagus with radial muscles. Vulva longitudinal or pore-like. Female reproductive system amphidelphic. Spicules dorylaimoid with lateral guiding pieces. Supplements an adanal pair, ventromedians arranged in 2-3 fascicles; occasionally a few ventral supplements also occur in between fascicles. Female tail elongate to long filiform, male tail obtusely rounded.

Type species :

Neoactinolaimus agilis Thorne, 196

Other species :

There are some 16 species reported under this genus including the following latest additions and new species :

N.gopeswari Khan and Jairajpuri, 1994

N. himanicus Khan and Jairajpuri, 1994

N. imphalensis Khan and Jairajpuri, 1994

N. protrudus n.sp.

For the list please refer Khan and Jairajpuri (1994)

NEOACTINOLAIMUS PROTRUDUS N.SP.

(Fig. 7)

Measurements :

Holotype female : L = 3.0 mm; a = 56; b = 5.6; c = 12.5; c' = 9.2; V = 43, G1 = 18.7; G2 = 24; odontostyle 21 um; odontophore 23 um; oesophagus 535 um; expanded part of oesopahgus 337 um; prerectum 177 um; rectum 63 um; tail 240 um; ABD = 26 um.

Description :

Female : Body almost striaght upon fixation. Cuticle marked with fine transverse striations, 2 um at midbody 3 um at tail portion. Lip region low, set off by very slight depression, 17 um wide, 6 um high. Amphids stirrup-shaped, apertures about one-half lip width wide. Lateral chords about one-fourth body width at midbody. Vestibular ring corrugated. Pharynx armed with four large onchia, each provided with a secondary tooth and faintly sclerotized vertical plate at the outer margin. Odontophore about 1.2 lip widths long, aperture about one - half of its length, strongly sclerotized. Guiding ring 'double', fixed ring at 19 um from anterior end. Odontophore simple, rod-like about 1.1 times odontophore length. Post-extension constriction of oesophagus present at 78 um from anterior end

and 45 um from the base of odontostyle. Nerve ring situated at 168 um from anterior end. Oesophagus begins to widen at about 37% and attains its full width at 51% of total oesophageal length from anterior end. Cardia elongate conoid, more than half of corresponding body width long. Cardiac disc present Oesophageal gland nuclei and their orifices are located as follows

DO	53.5	S_1N_1	70.3
DN	55	S_1N_2	75
DO - DN	1.5	S_2N	87
		S_2O	87

Reproductive system amphidelphic. Vulva longitudinally oval, protruded, vulva - vagina junction distinctly sclerotized. Vagina about 50% of corresponding body width deep, vaginal walls faintly sclerotized. Ovaries well developed. Uterus short, devoid of sperms. Weak sphincter present at oviduct - uterus junction. Both oviducts with 'Z' differentiation at the middle. Oocytes arranged in a single row except at the distal portion. Prerectum about 7 anal body widths long. Rectum more than two anal body widths long. Tail conoid, then long filiform about 9.2 anal body widths long. Caudal pores not observed.

Male : Not found.

Type habitat and locality : Soil around roots of coffee (***Coffea arabica***) from Masgode Estate, Kodagu Distt.

Type material : Collected in July 1993. Holotype female on slide ***Neoactinolaimus protrudus*** n. sp./1.

Relationship : ***Neoactinolaimus protrudus*** n.sp differs from all the other closely related species in having vertical plates on the onchia, 'Z' differentiation

of oviduct and protruded vulva. It resembles *N. **thornei*** Chaturvedi and Khera, 1979 and *N. **kosambus*** Khan ***et al.*** 1994. From *N. **thornei*** it differs in having a set off and expanded lip region, in the shape of vulva, presence of 'Z' organ, presence of vertical plates on onchia, shorter prerectum and a longer rectum (lip region low, rounded, continuous; vulva pore - like; 'Z' organ absent; vertical plates on onchia absent; prerectum four times as long as rectum; rectum 1.5 anal body widths long in *N. **thornei***). From *N. **kosambus***, it differs in having shorter odontostyle, in the presence of vertical plate on onchia, shorter odontophore, in the location and shape of vulva, 'Z' organ differentiation, longer prerectum and rectum (odontostyle 25-26 um; vertical plate absent on onchia; odontophore 24 - 26 um; vulva a small longitudinal slit, not protruded; 'Z' organ absent; V = 48 - 55; prerectum 5 - 6 anal body widths long and rectum 1.5 anal body widths long in *N. **kosambus***).

GENUS *EGTITUS* THORNE, 1967

The genus ***Egtitus*** was established by Thorne (1967) for those species having fine transverse striations on the cuticle but without longitudinal striae, in the absence of post - extension constriction of oesophagus and ventromedian supplements arranged in series. ***Egtitus bryophilus*** was proposed as the type species. Heyns and Argo (1969) synonymized ***Egtitus*** with ***Neoactinolaimus*** which was accepted by Baqri ***et al.*** (1975). Vinciguerra and Heyns (1984) revalidated ***Egtitus*** and differentiated it from ***Neoactinolaimus*** mainly in the arrangement of ventromedian supplements in a series rather than in groups (fascicles) as observed in ***Neoactinolaimus.*** Vinciguerra (1987), Vinciguerra and Coomans (1991) and Jairajpuri and Ahmad (1992) also regarded ***Egtitus*** a valid genus and transferred several species from ***Neoactinolamus*** to ***Egtitus***. Khan ***et al.*** (1994) added a new species to this genus. In the present work, two new species of ***Egtitus*** collected from Karnataka state is described and illustrated.

Diagnosis : (After Jairajpuri and Ahmad, 1992) Body about 1.4 - 2.8 mm long, cuticle with fine transverse striations. Vestibule armed with four massive onchia that are devoid of denticles or secondary tooth. Odontostyle dorylaimoid with aperture about one - third to one - half its length. Odontophore simple, rod - like. Post - extension constriction of oesophagus present or absent. Anterior slender part of oesophagus with radial muscles. Vulva a small longitudinal or transverse slit. Female reproductive system amphidelphic. Males with dorylaimoid spicules,

lateral guiding pieces and ventromedian supplements arranged in a series Female tail elongate to filiform; male tail short, obtusely rounded

Type species :

Egtitus bryophilus Thorne, 1967

Other species :

E. cyatholaimus (Daday, 1905) Thorne, 1967

E. elaboratus (Cobb, 1906) Thorne, 1967

E. lacustris (Loof, 1973) Vinciguerra, 1987

E. itanagrus Khan, Ahmad and Jairajpuri, 1994

E. neoelaboratus (Rahman ***et al.*** 1987) Jairajpur and Ahmad, 1992

E. nudus (Wu and Hoeppli, 1929) Thorne, 1967

E. surinamensis (Micoletzky, 1925) Thorne, 1967

E. zealandicus (Clark, 1963) Vinciguerra and Heyns, 1984

E. andhricus Khan and Jairajpuri, 1994

E. kazirangus Khan and Jairajpuri, 1994

E. naunii Khan and Jairajpuri, 1994

E. shillongensis Khan and jairajpuri, 1994

E. kodagus n.sp.

E. nethrus n.sp.

EGTITUS KODAGUS N.SP.

(Fig. 8)

Measurements :

Holotype male : L = 2.8 mm; a = 50.7; b = 5.2; c = 79.2; c' = 0.9, T = 67, spicule 60 um; lateral guiding pieces 15 um; ventromedian supplements 16,

odontostyle 21 um; odontophore 26 um; oesopahgus 535 um; expanded part of oesopahgus 252 um; prerectum 245 um; rectum 50 um; tail 35 um; ABD 38 um

Description :

Female : Not found.

Male : Body ventrally arcuate, more towards posterior end upon fixation Cuticle with fine transverse striations, 2 um at midbody and 4um at tail Lip set off by slight depression, 20 um wide, 6 um high. Amphids stirrup-shapped, apertures about two-fifth of lip width wide, slit-like. Odontostyle dorylaimoid, 21 um or about one lip width long, aperture about one-half its length. Odontophore simple, rod-like, about 1.2 times odontostyle length. Guiding ring 'double', fixed ring at 18 um from anterior end. Oesophagus tripartite, post-oesophageal constriction indistinct, expanded part slightly more than one-half oesophageal length. Nerve ring located at 168 um from anterior end. Cardia elongate-conoid, about 31 um or more than half of body width long. Oeosphageal gland nuclei and their orifices are located as follows :

DO	54	S_1N_1	78
DN	57	S_1N_2	79
DO-DN	3	S_2N	87
		S_2O	88

Testes paired, opposed, dorylaimoid with spindle-shaped sperms Spicules dorylaimoid, paired with bidentate tip, 1.6 anal body widths long Lateral guiding pieces well developed, bidentate, about one-fourth spicular length. Supplements an adanal pair and 16 regularly spaced ventromedians. Ventromedian supplements arranged about 6-9 um apart from one another.

Distance between cloaca and first ventromedian supplement about 90 um Prerectum, about 6 4 anal body widths long, terminating within the range of ventromedian supplements Rectum about 1 3 anal body widths long Tail bluntly rounded, less than one anal body width long, 5 caudal pores and a papilla below cloaca on each side

Type locality and habitat : Soil around roots of jack tree from Kodagu Distt Karnataka

Type material : Collected in May, 1993 Holotype male on slide ***Egtitus kodagus*** n sp /1

Relationship : ***Egtitus kodagus*** n sp closely resembles ***E. lacustris*** (Loof, 1973) Vinciguerra, 1987 and ***E. itanagrus*** Khan ***et al.*** 1994 From ***E. lacustris*** it mainly differs in having longer body, greater b, lesser c, T values and shorter odontostyle (L = 2 3-2 4 mm, b = 4 0-4 3, c = 101-118, T = 46-52, odontostyle 27-29 um in ***E. lacustris***) From ***E. itanagrus*** it differs in having greater a, b, c', values, shorter odontostyle, odontophore, in the shape of spicules and lateral guiding pieces, in having more ventromedian supplements, longer prerectum and tail (a = 35-44, b = 3 7-4 8, c' = 0 7-0 8, odontostyle 24-28 um, odontophore 24-30 um, spicules and lateral pieces not bidentate, ventromedian supplements 8-10, prerectum 90-196 um, tail 22 5-30 um in ***E. itanagrus***)

EGTITUS NETHRUS N.SP.

(Fig 8)

Measurements :

Holotype male : L = 1 4 mm, a = 41 6, = 4 1, c = 61 0, c' = 0 9, T = 52 5, spicule 40 um, lateral guiding pieces 8 um, ventromedian supplements 9, odontostyle

20 um, odontophore 18 um; oesophagus 344 um; expanded part of oesophagus 153 um; prerectum 77 um; rectum 49 um; tail 23 um; ABD 25 um

Description :

Female : Not found.

Male : Body small, ventrally curved upon fixation, more towards posterior end Cuticle with fine transverse striations, longitudinal ridges absent, 1 um at midbody, 2 um at tail. Lateral chords about one-fifth body width wide at midboy Lip region set off by slight expansion, 18 um wide, 8 um high Oral aperture circular. Amphids cup-shaped about 3/5 lip width wide, apertures slit-like Vestibule corrugated. Pharynx armed with four large onchia. Odontostyle more than one lip width long, aperture about one half of its length Guiding ring 'double', fixed ring located at 15 um from anterior end. Odontophore simple, rod-like, less than one odontostyle length, weakly sclerotized. Vestibular ring dentate, forming a crown around oral aperture. Post-extension constriction of oesophagus present. Nerve ring at 119 um from anterior end. Expanded part of oesophagus occupies about 45% of total oesophageal length Basal shield of oesophagus present. Cardia elongate-conoid, about one-half corresponding body width long.

Testes paired, opposed, dorylaimoid, sperms-spindle shaped, 6-8 um long Spicules dorylaimoid, about 1.6 anal body widths long Lateral guiding pieces rod-like, about one-fifth spicular length. Supplements an adanal pair and 9 ventromedians arranged serially, adjacent supplement about 6-9 um apart Prerectum about 3.1 anal body widths long, terminating within the range of supplements. Rectum about two anal body widths long Tail bluntly rounded,

slightly less than one anal body width long with one caudal pore on each side

Type habitat and locality : Soil around roots of ornamental plants (unidentified) from Nethrakonda Estate, Chikmagalur Distt.

Type material : Collected in August 1993. Holotype male on slide ***Egtitus nethrus*** n sp./1

Relationship : ***Egtitus nethrus*** n.sp. comes closer to ***E. elaboratus*** (Cobb, 1906) Thorne, 1967 and ***E. neoelaboratus*** (Rahman *et al.* 1987) Jairajpuri and Ahmad, 1992 From ***E. elaboratus*** it differs in having shorter body, lesser a value, shorter spicules, lateral guiding pieces and shorter expanded part of oesophagus (L = 1.56-1.85 um; a = 54-61; spicule 43-50 um; lateral guiding pieces 10-12 um; expanded part of oesopahgus 234-246 um in ***E. elaboratus***) It further differs from ***E. neoelaboratus*** in having shorter body, greater b, lesser c, T values, shorter odontostyle, odontophore, lateral guiding pieces and more ventromedian supplements (L = 1.53-1.67 um, b = 3.6-3 7, c = 70-73, T = 47-49; odontostyle 22-23 um; odontophore 21-24 um; lateral guiding pieces 8-11 um; ventromedian supplements 7-8 in ***E. neoelaboratus***).

SUBFAMILY PARACTINOLAIMINAE THORNE, 1967

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle marked with only minute transverse striations, longitudinal striations absent. Vestibule with four large onchia Walls of vestibule provided with numerous denticles Odontostyle massive, with aperture about half of its length. Post-extension constriction of oesophagus present. Female reproductive system amphidelphic Males with dorylaimoid spicules, lateral guiding pieces and ventromedian supplements arranged in a ventral series or in fascicles. Female tail elongate to long filiform, male tail short, obtusely rounded or long, filiform.

Type genus :

Paractinolaimus Meyl, 1957

Other genera :

Trachactinolaimus Andrássy, 1963

Westindicus Thorne, 1967

Afractinolaimus Andrássy, 1970

Dominicactinolaimus Jairajpuri and Ahmad, 1992

Paractinolaimoides Khan, Ahmad and Jairajpuri, 1994

GENUS *PARACTINOLAIMUS* MEYL, 1957

Meyl (1957) established the genus ***Paractinolaimus*** to accommodate those species with mural denticles in addition to four large onchia and cuticle without longitudinal ridges. He (l.c.) transferred many species from ***Actinolaimus*** to ***Paractinolaimus*** and ***Paractinolaimus micoletzkyi*** (Schneider, 1935)

Meyl, 1957 was proposed as its type species. Andrássy (1964) also transferred two species from ***Actinolaimus*** to ***Paractinolaimus***. Thorne (1967) described three new species and provided a key to the genus. Several workers have added some more species to this genus. Andrássy (1970) proposed a new genus ***Afractinolaimus*** closely resembling ***Paractinolaimus***. Baqri ***et al.*** (1987) while reporting a new species of ***Paractinolaimus*** expressed some doubts about the validity of ***Afractinolaimus***. Vinciguerra and Heyns (1984) considered ***Afractinolaimus*** a valid genus and transferred several species of ***Paractinolaimus*** to ***Afractinolaimus.*** Khan and Ganguly (1988), Khan ***et al.*** (194) described new species from India. Vinciguerra and Coomans (1991) synonymized ***Hexactinolaimus*** with ***Paractinolaimus***. In the present work, a new species of ***Paractinolaimus*** collected from the soil samples of Karnataka is described and illustrated.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body medium sized Cuticle finely transversely striated, longitudinal ridges absent Vestibule with four large onchia which may appear to be fused at base, rarely appearing as an arched structure. Vestibular walls with numerous denticles arising from ribbed plates Post-extension constriction of oesophagus present. Female reproductive system amphidelphic. Males with dorylaimoid spicules and lateral guiding pieces, supplements arranged serially. Famle tail elongate, male tail short, obtusely rounded

Type species :

Paractinolaimus micoletzkyi (Schneider, 1935) Meyl, 1957

Other species :

P. aruprus Khan, Ahmad and Jairajpuri, 1994

P. baldus Thorne, 1967

P. chiki n.sp.

P. filipjevi (Schneider, 1935) Meyl, 1957

P. girini Sukul, 1967

P. indicus Khan and Ganguly, 1988

P. intermedius Altherr, 1968

P. longidrilus Eveleigh, 1982

P. macrolaimus (De Man, 1880) Andrássy, 1964

P. microdentatus (Thorne, 1939) Meyl 1957

P. occalescens (Schneider, 1937) Vinciguerra, 1987

P. parietinus Eroshenko, 1977

P. prodenticulatus Heyns and Argo, 1969

P. proximus (Yeates, 1973) Vinciguerra and Coomans, 1991

P. robustus Thorne, 1967

P. ruwenzori (De Conink, 1935) Andrássy, 1964

P. spanithelus Eveleigh, 1982

P. vigor Thorne, 1967

P. xosorum Heyns and Argo, 1969

P. vulvapapillatus Khan, Ahmad and Jairjapuri, 1994

P. chandicus Khan and Jairajpuri, 1994

P. elongatus Khan and Jairajpuri, 1994

P. dhanachandi Khan and Jairajpuri, 1994

Species inquirenda :

P. macrodentatus Sukul, 1967

PARACTINOLAIMUS CHIKI N.SP.

(Fig. 9)

Measurements :

Holotype female : L = 2.6 mm; a = 63; b = 4.9; c = 15; V = 48; G1 = 15; G2 = 14; odontstyle 20 um; odontophore 20 um; oesophagus 528 um; prerectum 130 um; rectum 43 um; tail 176 um; ABD 27 um.

Paratype female (n = 1) : L = 2.9 mm; a = 64; b = 5.2; c = 17; V = 49; G1 = 14; G2 = 20; odontostyle 21 um; odontophore 20 um; oesophagus 558 um; prerectum 95 um; rectum 41 um; tail 176 um; ABD 26 um.

Description :

Female : Body slightly ventrally curved upon fixation. Cuticle 2-3 um thick at midbody and 3-4 um on tail. Lateral chords about one-fourth corresponding body width wide at midbody. Lip region set off by slight depression, 17 um wide, 6-7 um high. Amphids stirrup-shaped, apertures 6-7 um wide. Vestibular ring corrugated. Pharynx armed with four large onchia and nemerous denticles arranged in rows. Odontostyle 1.2 lip widths long, aperture about half of its length. Guiding ring 'double', fixed ring at 14-15 um from anterior end. Odontophore simple, rod-like as long as odontostyle. Post-extension constriction of oesophagus present at 45-47 um from base of odontostyle and 70-73 um from anterior end. Nerve ring located at 145-146 um from anterior end. Oesophagus dorylaimoid, basal expanded part occupies 53-55% of total oesophageal length. Basal shield of oesophagus present. Cardia elongate-conoid, 18-23 um long. Oeosphageal gland nuclei and their orifices are located as follows :

DO	45 -47	S_1N_1	75-76
DN	75 -76	S_1N_2	77-79
DO-DN	1.7-2.3	S_2N	84-86
		S_2O	85-87

Female reproductive system amphidelphic. Vulva longitudinally oval in shape, vagina about two-fifths of corresponding body width deep. Both sexual branches equally developed. Ovaries 199-208 um long with oocytes arranged in a single row except at the multiplication point. Oviduct 60-69 um long. Well developed sphincter present at oviduct-uterus junction. Uterus 122-131 um long. Prerectum 3.6-4.8 anal body width long. Rectum 1.5-1.6 anal body widths long. Tail long filiform. 6.5-6.8 anal body widths long, with 3 caudal pores on each side.

Male : Not found.

Type habitat and locality : Soil around roots of coffee (***Coffea arabica***) plantations from Elemetlu Estate, Chikmagalur Distt.

Type material : Collected in June, 1993. Holotype female on slide ***Paractinolaimus chiki*** n.sp./1 and paratype female on slide ***Paractinolaimus chiki*** n.sp./2.

Relationship : ***Paractinolaimus chiki*** n.sp. closely resembles ***P. robustus*** Thorne, 1967, ***P. baldus*** Thorne, 1967 and ***P. macrolaimus*** (De Man 1880) Andrássy, 1964. However it differs from ***P. robustus*** in having separated onchia, smaller odontophore, in the shape of vulva and in having smaller tail (four onchia fused together; odontophore 23 um; vulva pore-like or a small slit located in a cone- like depression and c = 11 in ***P. robustus***). From ***P. baldus*** it differs in

having smaller odontostyle and cardia, in the shape of vulva and in having smaller tail (odontostyle 27 um; cardia longer than body width; vulva a short longitudinal slit or pore-like and c = 11 in ***P. baldus***). From ***P. macrolaimus*** it differs in having smaller odontostyle, in the absence of vulval papillae, smaller tail (odontostyle 27 um; vulval papillae present on both sides of vulva and c = 8-10 in ***P. macrolaimus***).

GENUS *PARACTINOLAIMOIDES* KHAN, AHMAD AND JAIRAJPURI, 1992

The genus ***Paractinolaimoides*** was proposed by Khan ***et al.*** (1994) to accommodate those specimens which had four cheilostomal plates situated at level of onchia and nemerous mural denticles arranged in rows. This genus shares the characters of ***Paractinolaimus*** and ***Scleroactinolaimus. Paractinolaimoides unicus*** was proposed as its type species. In the present work, a new species of ***Paractinolaimoides*** collected from the soil samples from Karnataka is described and illustrated.

Diagnosis : (Emended). Body moderate-sized, slightly ventrally arcuate upon fixation. Cuticle thick with fine transverse striations. Lip region set off by a depression. Amphids stirrup-shaped with slit-like apertures. Vestibule corrugated. Cheilostome, in addition to four onchia, provided with nemerous denticles arranged in definite rows and four additional vertical plates at the level of onchia. Odontostyle dorylaimoid with aperture about one-half odontphore length. Post extension constriction of oesophagus present. Basal shield present. Female reproductive system amphidelphic. Vulva transverse or longitudinally oval. "Z" differentiation present or absent. Males with dorylaimoid spicules, lateral guiding pieces and 10-12 spaced ventromedian supplements arranged serially. Female tail long filiform with an acute tip. Male tail short conoid with bluntly rounded tip.

Type species :

Paractinolaimoides unicus Khan, Ahmad and Jairajpuri, 1994.

Other species :

P. longicaudatus n.sp.

PARACTINOLAIMOIDES LONGICAUDATUS N.SP.

(Fig 10)

Measurements :

Holotype female : L = 2 7 mm, a = 48 5, b = 4 5, c = 6 6, c' = 14 6, V = 48, G1 = 20, G2 = 15, odontostyle 25 um, odontophore 28 um, oesophagus 595 um, expanded part of oesophagus 316 um, prerectum 170 um, rectum 72 um, tail 400 um, ABD 28 um

Paratype females (n = 2) : L = 2 6-2 7 mm, a = 47-48 5, b = 4 3-4 5, c = 6 5-7, c' - 11-14 3, V = 48, G1 = 16-20, G2 = 15-19, odontostyle 23-25 um, odontophore 28-29 um, oeosophagus 595-603 um, prerectum 89 - 145 um, rectum 60-66 um, tail 373-400 um, ABD 28-32 um

Paratype males (n = 3) : L = 1 9-2 0 mm, a = 37-41, b = 3 5-3 7, c = 86 2-99, c' = 0 6, T = 52-55, spicule 55-62 um, lateral guiding pieces 7-9 um, ventromedian supplements 10-12, odontostyle 23-26 5 um, odontophore 27-28 um, oeosphagus 544 - 547 um, expanded part of oesophagus 297-303 um, prerectum 140-160 um, rectum 59-62 um, tail 21 - 22 um, ABD 34-35 um

Description :

Female : Body striaght to slightly ventrally arcuate upon fixation, more so on the posterior region Cuticle finely, transversely striated, 2-3 um thick at modbody, 4-5 um at tail Lateral chords about one fourth body width wide at modbody Lip region rounded, set off by constriction, about 2 5 times as wide as high Vestibular ring corrugated Cheilostome armed with onchia and denticles arranged in rows Additional vertical plates associated with cheilostome

at level of onchia present. Odontostyle 1.1-1.3 times lip widths long with aperture about two-fifths of its length. Guiding ring 'double', fixed ring at 19-21 um from anterior end. Odontophore simple, rod-like, longer than odontostyle. Post-extension constriction of oesophagus present at 88-95 um from anterior end. Nerve ring at 152-176 um from anterior end Oeosophageal expansion gradual, attains its full width at 45-47% of its total length Cardia elongate-conoid, 18-25 um long. Basal shield present. Oesophageal gland nuclei and their orifices are located as follows :

DO	47 - 49	S_1N_1	77 - 78
DN	48 - 50	S_1N_2	77-79
DO - DN	1 - 1.5	S_2N	84 - 85
		S_2O	85 - 86

Female reproductive system amphidelphic. Vulva longitudinally oval in shape with two cuticularized pieces present on both sides. Vaginal walls sclerotized, about one-third corresponding body width deep. Both sexual branches developed almost equally, ovaries well developed 150-302 um long with oocytes arranged in a single row except at the region of multiplication. Sphincter present at oviduct-uterus junction. Uterus with full of spindle-shaped sperms. "Z" organ differentiation distinct. Prerectum 2.8 - 6.1 anal body widths long Rectum about 1.9-2.6 anal body widths long. Tail gradually tapering to very long foliform structure, 11-14 anal body widths long.

Male : Similar to females in general structure. Testes paired, opposed, dorylaimoid, sperms spindle-shaped, 6-8 um long. Spicules dorylaimoid, 1.4-1.7 anal body widths long. Lateral guiding pieces about one-seventh spicular length.

Supplements an adanal pair and 10-12 serially arranged ventromedians Ventromedian supplements end 15-22 um above the range of prerectum Distance between cloaca and ventromedian supplement about 62-69 um, prerectum 4-5 anal body widths long. Rectum 1.7-1.8 anal body widths long Tail short, bluntly rounded, about 0 6 anal body width long with 3 caudal pores on each side

Type habitat and locality : Soil around roots of coffee (***Coffea arabica***) plantations from Kurkenmutty Estate, Chikmagalur Distt

Type material : Collected in January, 1995. Holotype female on slide ***Paractinolaimoides longicaudatus*** n.sp./1 and paratype females and males on slides ***Paractinolaimoides longicaudatus*** n.sp./2-4.

Relationship : ***Paractinolaimoides longicaudatus*** n.sp differs from the only other species ***Paractinolaimoides unicus*** Khan ***et al.*** 1994 in having a longer body, very long tail, greater ABD, longer odontostyle, odontophore, prerectum, in the structure of vulva, in the presence of "Z" organ, in the size of spicules, lateral guiding pieces and in the range of ventromedian supplements (L =1.9-2 1 um; tail 247-266 um, ABD 22 5-28.5 um, c' = 9-11, odontostyle 21-22.5 um; odontophore 24.0-25.5 um; prerectum 87-105 um, vulva transverse; "Z" organ absent; ventromedians end within the range of prerectum, spicules 54-57 um and lateral guiding pieces 10.5-12 um in ***P. unicus***)

SUBFAMILY BRITTONEMATINAE THORNE, 1967

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body fusiform. Lip region narrow, continuous or broadly expanded. Cuticle with prominent longitudinal ridges except in ***Stropractinca*** Khan ***et al.*** 1994. Odontostyle usually 2-3 times lip widths long, aperture about one-third of its length. Anterior portion of oesophagus a slender hyaline tube. Basal shield of oesophagus prominent. Female reproductive system amphidelphic. Males with dorylaimoid spicules, lateral guiding pieces and ventromedian supplements arranged in groups (fascicles) or spaced in a series.

Type genus :

Brittonema Thorne, 1967

Other genera :

Actinca Andrássy, 1964

Stomachoglossa Andrássy, 1986

Parastomachoglossa Coomans and Loof 1986

Paractinocephalus Andrássy, 1973

Stopractinca Khan, Ahmad and Jairajpuri, 1994

GENUS *STOPRACTINCA* KHAN, AHMAD AND JAIRAJPURI, 1994

Khan ***et al.*** (1994) established the genus ***Stopractinca*** to accommodate those species of actinolaim nematodes which possess comparatively slender onchia, oesophago-intestinal junction provided with a valve-like structure,

presence of vulval papillae and large number of ventromedian supplements arranged in a series This genus shares the characters of ***Stomachoglossa, Parastomachoglossa*** and ***Actinca. Stopractinca orientalis*** was proposed as its type species In the present work soil samples collected from the Malnad tracts yielded a new species of ***Stopractinca*** which is described and illustrated

Diagnosis : (Emended) Body large sized, tapering strongly to a narrow lip region, about one-fifth to one-fourth as wide as base of oesophagus Cuticle thick, marked with zig-zag lines or simply transversely striated Lip region set off by slight depression Amphids stirrup-shaped with slit-like apertures Four additional teeth present below onchia. Pharyngeal chamber globular, at the base of pharyngeal armature, small cuticularized pieces present to which guiding ring is attached Guiding ring 'double' Odontostyle dorylaimoid, comparatively slender Odontophore simple, rod-like Post-extension constriction of oesophagus absent Cuticularized tongue-shaped pieces present or absent between base of oesophageal lumen and cardia Basal shield of oesophagus present Female reproductive system amphidelphic. Vulva oval or pore-like, vulval papillae present or absent. Males with dorylaimoid spicules, lateral guiding pieces and 18-20 regularly spaced ventromedian supplements Female tail long, filiform, terminating in an acute tip. Male tail short, bluntly rounded

Type species :

Stopractinca orinetalis Khan, Ahmad and Jairajpuri, 1994

Other species :

Stopractinca malnadensis n.sp

STOPRACTINCA MALNADENSIS N.SP.

(Fig 11)

Measurements :

Holotype female : L = 2 6 mm, a = 38, b = 4 3, c = 10 7, V = 47, G1 = 16, G2 = 17, odontostyle 26 um, odontophore 23 um, oeosphagus 615 um, prerectum 184 um, rectum 66 um, tail 245 um, ABD 38 um

Paratype females (n = 11) : L = 2 5-3 1 (2 9 ± 0 3) mm, a = 38-49 (44 7 ± 5 6), b = 4 3-4 7 (4 5 ± 0 2), c = 11-13 (11 5 ± 0 9), V = 47-48 G1 = 7-16 (12 8 ± 4 9), G2 = 13-17 (15 ± 2 3), odontostyle 23-28 um, odontophore 23-25 um, oeosophagus 615-665 um, prerectum 184-229 um, (203 9 ± 23 3) um, rectum 65-68 um, tail 236-275 (251 ± 20 7) um, ABD 34-38 um

Paratype males (n = 4) : L = 2 1-2 2 (2 1) mm, a = 37-39, b = 3 5-4 1 (3 8), c = 54-64 (58), T = 49-57, odontostyle 26-27 (26 3) um, odontophore 20-23 (22 2) um, oesophagus 516-619 (574) um, spicules 69-72 (70) um, lateral guiding pieces 17-19 (18) um, ventromedian supplements 20-21, prerectum 148-245 (203) um, rectum 64-66 (63) um, tail 38-40 (39) um, ABD 38-41 (39) um

Description :

Female : Body striaght to slightly ventrally curved upon fixation, more prominently in the posterior region Anterior region tapering to a narrow lip region, about one-third to one-fourth as wide as base of oeosphagus Cuticle marked with fine transverse striations, 4-5 um thick at midbody and 5-6 um at tail region Lateral chords nearly one-fourth of corresponding body width wide at midbody Dorsal and ventral body pores visible, spaced regularly, 2-4 dorsal and 6-10

ventral pores present in the oesophageal region. Lip region rounded, set off by constriction and nearly 16-18 um wide, 7-9 um high. Amphids cup-shaped, apertures 7-8 um wide, slit-like. Vestibular ring corrugated. Pharynx provided with four onchia. An additional tooth present below each onchium Pharyngeal chamber globular at base with two globular cuticularized pieces in lateral view Odontostyle simple, dorylaimoid, 1.4-1 6 times lip region width long with aperture about one-third of its length. Guiding ring 'double', fixed ring at 18-20 um from anterior end. Odontophore simple, rod-like about 0 8-0.9 odontostyle length. Post-extension constriction of oesophagus absent Nerve ring at 145-184 um from anterior end. Oesophagus tripartite with a slender anterior part, gradually widening median part and a long expanded posterior part. The second part starts at 148-185 um from anterior end of body (just below nerve ring) and ends, where oesophagus attains its full width The third enlarged part occupies 47-54% of total oeosphageal length. Basal shield present Cardia elongate-conoid, 18-26 um long. Oesophageal gland nuclei and their orifices are located as follows :

DO	48 - 52	S_1N_1	75 - 77
DN	50 - 55	S_1N_2	77 - 79
DO-DN	2.1-2.5	S_2N	86-88
		S_2O	87 - 89

Reproductive system amphidelphic. Vulva longitudinally oval in shape, vagina 35-37 um or about one-half corresponding body width deep, provided with distinct cuticularized pieces. Both sexual branches equally developed Demarcation of different parts of gonad not very clear due to dense fatty

granulation Prerectum 4 8-5 5 anal body widths long Tail 6 4-7 8 anal body widths long, gradually tapering to become long filiform Caudal pores 3 on both the sides

Male : Testes paired, opposed, dorylaimoid Sperms spindle-shaped, 7-8 um long Spicules dorylaimoid, 1 8 anal body widths long Tail short, bluntly rounded, 0 9-1 0 anal body width long with three caudal pores on each side

Type habitat and locality : Soil around roots of coffee (***Coffea arabica***) from Lal Bagh Estate, Giris, Karnataka state

Type material : Collected in June 1993 Holotype female on slide ***Stopractinca malnadensis*** n sp /1 and paratype females and males on slides ***Stopractinca malnadensis*** n sp /2-4.

Relationship : ***Stopractinca malnadensis*** n sp differs from ***S. orientalis*** Khan, Ahmad and Jairajpuri, 1994, the only other species of the genus in having finely transversely striated cuticle (without zig-zag lines), greater a value, in the absence of cuticularized process between the base of oesophageal lumen and cardia, in the absence of advulval papillae, in having longer tail, rectum and spicules (cuticle marked with zig-zag lines, a = 33-40, cuticularized process present between the base of oesophageal lumen and cardia, 2-3 advulval papillae present on each side of the vulva; tail 167-227 um, rectum 48-60 um and spicules 62-65 um in ***S. orientalis***).

SUPERFAMILY LONGIDOROIDEA *THORNE*, 1935

Khan and Ahmad (1975) established Longidoroidea which was initially considered as subfamily Longidorinae by Thorne in 1935. Thorne and Swanger (1936) included three genera, viz., ***Longidorus*** Micoletzy, 1922, ***Xiphinema*** Cobb, 1913 and ***Longidorella*** Thorne, 1939 under the subfamily Longidorinae. The genus ***Paralongidorus*** was added by Siddiqi, Hooper and Khan (1963). The genus ***Xiphidorus*** was described by Monteiro (1970). Robbins and Weiner (1978) proposed a new subfamily Californidorinae for ***Californidorus*** which was synonymised with Pungentinae under Nordiidae by Jairajpuri (1982). Chaves and Coomans (1984) did not accept Longidoroidea and recognised only subfamilieis Longidorinae and Xiphinematinae under Longidoridae. Luc and Doucet (1984) accepted only a familial stutus for the whole group. The genera ***Siddiqia*** Khan, Chawla and Saha, 1978 and ***Inagreius*** Khan, 1982 were synonymised with ***Paralongidorus*** and ***Longidorus*** respectively by Luc and Doucet (1984). Jairajpuri and Ahmad (1992) recognised Xiphinematidae and Longidoridae under the Superfamily Longidoroidea. Siddiqi, Baujard and Mounport (1993) synonymized ***Longidoroides*** with ***Paralongidorus***.

In the present work, it was observed that longidorid nematodes are quite widely distributed in the Malnad tracts and their population dynamics also outnumbers other groups. Most of the soil samples collected in this work yielded longidorids in large numbers. However, the number of species involved is not large.

Diagnosis : (After Jairajpuri & Ahmad, 1992). Body slender, large - sized Lip region continuous or set off. Amphids with large pouch, funnel or stirrup-shaped fovea and pore or slit - like apertures. Odontostyle long, attenuated, with fine lumen and aperture. Odontophore simple, rod - like with or without basal flanges, odontostyle - odontophore junction simple or complex Guiding ring single or 'double'. Oesophagus with an anterior non-muscular, convoluted, tubular part, set off from expanded muscular part, occupying about one-fourth of total oesopahgeal length. Nuclei of second pair of oesophageal glands (S_2N) and their orifices (S_2O) visible. Female reproductive system monodelphic or amphidelphic. Vulva transverse. Spicules arcuate, lateral guiding pieces and ventromedian supplements present. Tails similar in sexes.

Type family :

Longidoridae Thorne, 1935

Other family :

Xiphinematidae Dalmasso, 1969

FAMILY LONGIDORIDAE THORNE, 1935

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region continous or set off by constriction. Amphids with pouch, funnel or stirrup-shaped fovea and pore or slit-like apertures. Guiding ring single. Junction between odontostyle and odontophore simple. DN at some distance from DO. DN generally oblong, smaller than SVN. Female reproductive system amphidelphic Tails short, conoid, similar in sexes.

Type and only subfamily :

Longidorinae Thorne, 1935

SUBFAMILY LONGIDORINAE THORNE, 1935

Diagnosis : (After Jairajpuri and Ahmad, 1992). Amphids with pouch, funnel or stirrup-shaped fovea and pore or slit-like apertures. Guiding ring single. Junction of odontostyle-odontophore simple. DO-DN at some distance. DN oblong, smaller than SVN. Female reproductive system amphidelphic. Tails short, conoid or rounded, similar in sexes.

Type genus :

Longidorus Micoletzky, 1922

Other genus :

Paralongidorus Siddiqi, Hooper and Khan, 1963

GENUS *LONGIDORUS* MICOLETZKY, 1922

Micoletzky (1922) while publishing a monograph on soil nematodes, noticed that although most of the ***Dorylaimus*** species were ontogenitically related, they could be divided into groups on the basis of distinct morphological characters. He (l.c.) divided the genus ***Dorylaimus*** into five subgenera. In the subgenus ***Dorylaimus (Longidorus)*** he included species with long odontostyle and ***Dorylaimus (Longidorus) elongatus*** was proposed as the type species. Filipjev (1934) and Thorne (1934) while publishing separate notes, agreed that ***Longidorus*** should be considered as a genus of the family Dorylaimidae. Siddiqi (1962) gave proper definition to the genus ***Longidorus.*** Several workers have added a number of species to this genus and at present there are more than 80 species in this genus including ***Longidorus arthensis*** Brown ***et al.*** (1994). In the

present study, soil samples collected from Karnataka state yielded a new species of ***Longidorus*** which is described and illustrated as ***L. indicus*** n sp

Diagnosis : (After Jairajpuri and Ahmad, 1992) Body usually long, slender Lips continous, amalgamated Lateral chords wide with body pores in one or two rows Amphids large, fovea pouch-like with unlobed or symmetrically or asymmetrially bilobed base Apertures of amphids usually minute, pore-like, often inconspicuous Odontostyle long and attenuated Basal flanges of odontophore absent Junction of odontostyle-odontophore simple Guiding ring single, anteriorly located DN usually at some level from DO SVN more developed than DN Female reproductive system amphidelphic Vulva transverse Males with dorylaimoid spicules, lateral guiding pieces and ventromedian supplements Tails short, conoid or bluntly rounded, similar in sexes

Type species :

Longidorus elongatus (De Man, 1876) Thorne and Swanger, 1936

Other species :

More than 80 species For list of species refer Jairajpuri and Ahmad (1992)

LONGIDORUS INDICUS N.SP.

(Fig 12)

Measurments :

Holotype female : L = 2 4 mm, a = 62 2, b = 6 8, c = 7 7, c' = 1 0, V = 52, G1 = 9 0, G2 = 9 5, odontostyle 93 um, odontophore 54 um, oesophagus 348 um, expanded part of oesophagus 84 um, prerectum 287 um, rectum 2? 5 um, tail 31 um, ABD 31 um

Paratype female (n = 5) : L = 2 7-2 9 (2 8 ± 0 1) mm, a = 65-71 8 (68 4 ± 3 4), b = 6 5-7 9 (7 1 ± 0 7), c = 79 1-87 (83 7 ± 4 1), c' = 1-1 1, V = 49-52 5, G1 = 7 6-8 7, G2 = 6 6-8 2, odontostyle 93-105 (98 5 ± 6 1) um, odontophore 50-67 5 (57 ± 10) um, oesophagus 353-453 (397 ± 45) um, expanded part of oesophagus 82-90 (86 ± 3 8) um, prerectum 187-293 (235 ± 53) um, rectum 24-30 um, tail 33-34 5 (33 5 ± 0 9) um, ABD 31-35 um

Description :

Female : Body moderately long, slender, tapering towards extremities, open "C" shaped upon fixation Cuticle finely, transversely striated, about 2 um at mid-body, 5-6 um at tail Lateral chords about one-fifth body width wide at midbody Lip continuous, rounded, amalgamated Labial papillae distinct Amphidial fovea a large pouch, about 9-10 5 um long and 6-7 5 um wide, basal boundaries symmertically bilobed, apertures obscure Guiding ring single, located at 28-31 um from anterior end Odontostyle typical of the genus, long, attenuated, 93-105 um Odontophore weakly sclerotized, slightly longer than one-half of odontostyle Basal flanges absent, but muscles surrounding odontophore slightly bulged at the base Odontostyle-odontophore junction simple Nerve ring located at 173-210 um from anterior end Cardia small, bluntly conoid to rounded, 6-9 um long Oesophagus typical of the genus Anterior part a slender tubular structure, often convoluted just above the expansion Expanded part of oesophagus short, cylindroid about 20-23 4% of total oesophageal length Expansion almost abrupt SVN more distinct than DN Oesophageal gland nuclei and their orifices are located as follows

DO	78 - 79	S_1N_1	88 - 89
DN	82 - 83	S_1N_2	89 - 90

DO-DN 3.5 - 4

Reproductive system amphidelphic. Vulva almost equatorial, transverse, thick-walled, opening a wide slit. Vagina about one-half corresponding body width deep. Both gonads equally developed. Distinct sphincter present at oviduct-uterus junction. Prerectum 187-293 or 5.4-9.3 anal body widths long. Rectum about one anal body width long. Tail dorsally convex, bluntly rounded, about 1-1.1 anal body width long. Two caudal pores on each side flaring in opposite body directions to each other present. Distal tip of the tail with a bunch of refractive radial striae.

Male : Not found.

Type habitat and locality : Soil around roots of tea plants (***Camellia sinensis***) from Devon Estate, Chikmagalur.

Type material : Collected in March, 1993. Holotype female on slide ***Longidorus indicus*** n.sp./1 and paratype females on slides ***Longidorus indicus*** n.sp./2-4.

Relationship : ***Longidorus indicus*** n.sp. closely resembles ***L. congoensis*** Aboul-Eid, 1970, ***L. laevicapitatus*** Williams, 1959 and ***L. africanus*** Merny, 1966 in having body length 2.8-2.9 mm. From ***L. congoensis*** it differs in having higher a, c', V values, lesser b, c values, longer odontostyle, shorter odontophore, location of guiding ring, nerve ring, longer expanded part of oesophagus and shorter prerectum (a = 50-61; b = 9.1-11.5; c = 82-114; c' = 0.8; V = 45-48; odontostyle 66-81 um; odontophore 32-66 um; guiding ring 25 um; expanded part of oesophagus 32-66 um; guiding ring at 25 um; nerve ring 145-159 um and

prerectum 169-382 um in *L. congoensis*). Further, it differs from *L. laevicapitatus* in having higher a, c, c' values, lesser b value, longer odontostyle and odontophore (a = 47-56; b =9.1-11.5; c = 58-68; c' = 1.2; tail 32-36 um; odontostyle 55-60 um; odontophore 44-54 um in *L. laevicapitatus*). From *L. africanus* it differs in having lesser a, b, c' values, shorter tail and longer odontostyle (a = 72-107; b = 8.5-12.2; c' = 1.3-1.8; tail 33-49 um and odontostyle 68-101 um in *L. africanus*).

GENUS *PARALONGIDORUS* SIDDIQI, HOOPER AND KHAN, 1963

Siddiqi, Hooper and Khan (1963) proposed the genus ***Paralongidorus*** for those species having a combination of characters of ***Longidorus*** and ***Xiphinema*** Under this genus they had included species which had no flanges on the odontophore, single and anteriorly placed guiding ring, wide amphids which are funnel to stirrup-shaped ***Paralongidorus sali*** was proposed as its type species Several workers described a large number of species from India and abroad Siddiqi ***et al.*** (1993) synonymized ***Longidoroides*** with ***Paralongidorus*** and proposed 13 new combinations In the present work soil samples collected from Karnataka State yielded a new species that is described and illustrated

Diagnosis : (Emended) Body usually long and slender, sometimes upto 12 mm Lip region set off by deep constriction or continous Amphids stirrup-shaped or pouch-like, unlobed or bilobed at base, apertures slit-like Odontostyle long, attenuated with distinct lumen and aperture Odontophore simple, rod-like, weakly sclerotized Odontostyle-odontophore junction simple Guiding ring single, anteriorly located Oeosphagus typical of the group DN at some distance from DO Like other longidorids, SVN more prominent than DN Female reproductive system amphidelphic. Males with dorylaimoid reproductive structures Tails short, conoid or bluntly rounded, similar in sexes

Type species :

Paralongidorus sali Siddiqi, Hooper and Khan, 1963

Other species :

There are more than 60 species of the genus ***Paralongidorus*** including ***P. lemoni*** Siddiqi, Baujard and Mounport, 1993 and ***P. ciaressi*** n sp

For the list of other species, refer Jairajpuri and Ahmad (1992)

PARALONGIDORUS CIARESSI N.SP.

(Fig 12)

Measurments :

Holotype female : L = 8.7 mm; a = 218.4; b = 19.3, c = 241.1; c' = 1 1, V = 48, G1 = 3.3; G2 = 3 3; odontostyle 101 um; odontophore 60 um; oesophagus 450 um; expanded part of oesophagus 107 um; prerectum 668 um, rectum 33 um, tail 36 um; ABD 33 um.

Paratype females (n = 3) : L = 7-8.7 mm; a = 166 4-206 7, b = 14 1-18, c = 233-242; c' = 0.9-1.1; V = 47-52; G1 = 4.2-5; G2 = 4.1-4.5; odontostyle 110-114 um; odontophore 60-68 um; oesophagus 483-497 um; expanded part of oesophagus 117-140 um; prerectum 630-668 um, rectum 34-45 um, tail 30-36 um; ABD 34-35 um.

Description :

Female : Body long, slender, almost coiled upon fixation, tapering towards extremities Cuticle very finely, transversely striated, in two distinct layers, much thicker at tail region Inner layer of tail cuticle with radial striations Lateral chords about one-fourth body width wide at midbody, glandular Body pores present. Lip set off by constriction, about one-third body width wide, amalgamated. Amphids about nine-tenths of lip width wide, stirrup-shapped,

apertures slit-like. Odontostyle long, attenuated, slightly arcuate with fine lumen, about 2.5-2.7 body widths long. Odontophore slightly more than one half odontostyle length long, weakly sclerotized, base surrounded by bulged pharyngeal muscles. Odontostyle-odontophore junction simple Guiding ring single, located at 30-33 um from anterior end. Nerve ring just below odontophore base or on the base of odontophore itself, 215-231 um from anterior end Oesophagus typical of the group, anterior slender part tubular, often convoluted above the expansion point. Cardia short, bluntly rounded, about one fourth corresponding body width long Oesophageal gland nuclei and their orifices are located as follows :

DO	75 - 76	S_1N_1	85 - 86
DN	76 - 78	S_1N_2	86 - 87

DO-DN 1 7-2.1

Reproductive system amphidelphic. Vulva almost equatorial, transverse, opening very wide, thick-walled. Vagina weakly sclerotized, extends more than one-half corresponding body width, structure typical of the genus Uterus moderately long, sac-like without sperms Well developed sphincter present at oviduct-uterus junction. Oocytes arranged in a single line except at multiplication point. Prerectum very long, about 18-20 anal body widths long Rectum about one anal body width long or slightly more than that Tail short, convex-conoid dorsally, about 0.9-1 1 anal body widths long Caudal papillae 2-3 on each side.

Male : Not found.

Type habitat and locality : Soil around roots of grasses (unidentified) from the premises of Coffee Research Station, Chikmagalur Distt.

Type material : Collected in April 1993. Holotype female on slide ***Paralongidorus ciaressi*** n.sp./1 and paratype females on slides ***Paralongidorus ciaressi*** n.sp./2-4.

Relationship : ***Paralongidorus ciaressi*** n.sp. closely resembles ***P. paramaximus*** Heyns, 1965 and ***P. capensis*** Heyns, 1966 in having moderately long body. It can be differentiated from ***P. paramaximus*** in having narrower lip region, in the structure of amphids, in having shorter odontostyle, odontophore, anteriorly located guiding ring, shorter gonads and in the absence of males (lip region 24-29 um; amphids with crescent-shaped apertures, odontostlye 122-169 um; odontophore 60-98 um; guiding ring 28-39 um; G1 = 10.3; G2 = 8.1 and males present in ***P. paramaximus***). Further, it differs from ***P. capensis*** in having shorter tail, gonads, narrower lip region, amphids, shorter odontostyle, longer odontophore, anteriorly located guiding ring, longer prerectum and in the absence of males (tail 42 um; G1 = 5.9-8.4; G2 = 5.7-9.6; lip region 19-20 um; amphids two-thirds lip width wide, odontostyle 124-132 um; odontophore 48-58 um; guiding ring 40-46 um; prerectum 7-11 anal body widths long and males present in ***P. capensis***).

FAMILY XIPHINEMATIDAE DALMASSO, 1969

Diagnosis : (After Jairajpuri and Ahmad, 1992) Lip region set off by constriction or continuous. Amphids with stirrup-shaped or pouch-like fovea, apertures slit or pore-like. Guiding ring 'double', located near base of odontostyle Odontostyle-odontophore junction forked. Odontophore base with moderate to well developed flanges. Female reproductive system monodelphic or amphidelphic Tails short-conoid to rounded or elongate-conoid, digitate; similar in sexes

Type subfamily :

Xiphinematinae Dalmasso, 1969.

Other subfamily :

Xiphidorinae (Khan, Chawla and Saha, 1978) Jairajpuri and Ahmad, 1992

SUBFAMILY XIPHINEMATINAE DALMASSO, 1969

Diagnosis : (After Jairajpuri and Ahmad, 1992) Lip region continous or slightly set off by conctriction. Amphids with stirrup-shaped fovea, apertures slit-like Guiding ring 'double'. Odontostyle typical of the group, long, attenuated Odontostyle-odontophore junction forked. Odontophore base with well developed flanges. DN at same level as DO, SVN less developed than DN Female reproductive system monodelphic or amphidelphic. Tails short, conoid to rounded, digitate or long filiform; similar in sexes

Type and only genus :

Xiphinema Cobb, 1913

GENUS *XIPHINEMA* COBB, 1913

Cobb (1913) established the genus ***Xiphinema*** with ***X. americanum*** as its type species Longidorid nematodes which have a long slender body, stirrup-shaped amphids with slit-like apertures, long attenuated odontostyle, odontostyle-odontophore junction forked, amphidelphic, monodelphic or psedo-monodelphic reproductive systems and variable tail shapes, similar in sexes ***Xiphinema*** is closely related to ***Longidorus*** Micoletzky, 1922 and ***Paralongidorus*** Siddiqi ***et al.*** 1963 Several workers have contributed a very large number of species to this genus This is one of the most widespred genus throughout the world There are more than 200 species described under this genus so far apart from the 12 species which are considered to be ***species inquirendae*** In the present work, soil samples collected from various parts of the Malnad tracts yielded 4 known and a new species of the genus ***Xiphinema*** that are described and illustrated ***X. simillum*** Loof and Yassin, 1971 is reported for the first time from India

Diagnosis : (After Jairajpuri and Ahmad, 1992) Body long and slender, about 1-6 mm Lip region set off or continous Amphids with stirrup-shaped fovea and slit-like apertures Guiding ring apparently tubular, fixed ring located at base of odontostyle Odontostyle long attenuated, forked at junction with odontophore Odontophore with well developed flanges Oesophagus typical of the group Anterior slender part tubular, often convoluted at expansion point. Expanded part of oesophagus about one-third total oesophageal length Only three oesophageal gland nuclei present DN usually at same level as DO

SVN less developed than DN. Female reproductive system monodelphic or pseudo-monodelphic or amphidelphic. Uterus with or without Z-organ. Males with typical dorylaimoid structures Tails greatly variable in shapes and size, short conoid to long filiform; similar in sexes.

Type species :

Xiphinema americanum Cobb, 1913.

Other species :

There are more than 200 species including

*X. **franci,*** Heyns and Coomans, 1994

*X. **silvicolla*** Swart, 1994

*X. **morasiae*** Swart, 1994

*X. **spinosum*** Swart, 1994

*X. **cynodontis*** Nasira and Maqbool, 1994

*X. **dimorphis*** n.sp. and some 12 species inquirendae

For the list of species refer Jairajpuri and Ahmad (1992) and Loof, Jairajpuri and Ahmad (1995).

XIPHINEMA AMERICANUM COBB, 1913

Measurements :

Females (n = 3) : L = 1.4-1.5 mm; a = 46.3-49.7; b = 5.5-5 8; c = 48.6-52 1, c' = 1 2-1 3; V 53-54; G1 = 7; G2 = 9-11; odontostyle 78-87 um, odontophore 46-50 um; guiding ring 60-69 um; amphids 6-7 um; oesophagus 248-282 um, expanded part of oesophagus 60-66 um; nervering 159-186 um, cardia 7-8 um, prerectum 230-237 um; rectum 23-25 um; tail 28-30 um; ABD 23-25 um

Male : Not found

Habitat and locality : Soil around roots of areca plants (***Areca catechu***) from Kalasa, Chikmagalur Distt.

Remarks : The present specimens conform well with the type species *X. americanum* Cobb, 1913 except in c' value, longer odontostyle and prerectum (c' = 1 4-1 6, odontostyle 70-75 um, prerectum 5-7 anal body widths long in the type material vs 8-9 5)

XIPHINEMA INSIGNAE LOOS, 1949

Measurements :

Females (n = 9) : L = 2-2 8 (2 3 ± 0 3) mm, a = 56-82 1 (66 4 ± 9 7), b - 5 4 - 7 2 (6 2 ± 0 7), c = 17-26 (22 ± 4 1), c' = 4 4-7 9 (5 6 ± 1 2), V = 26-33 (30 5 ± 2 3), G1 = 3-6 5, G2 = 7-22 6, odontostyle 72-110 (95 2 ± 13 2) um, odontophore 56 - 71 (60 5 ± 5 4) um, guiding ring 75-97 um, oesophagus 348-387 (370± 15) um, expanded part of oesophagus 84-119 um, nerve ring 183-199 um, cardia 4-7 um, prerectum 301-537 (428 ± 88) um, rectum 31-37 um, tail 84 - 118 (102 ± 13) um, ABD 19-21 um

Male : Not found

Habitat and locality : Soil around roots of tea plants (***Camellia sinensis***) from Quard Hitlu Estate Chikmagalur Distt

Remarks : The present specimens conform well with the description of *X. insignae* Loos, 1949 except in having slightly longer odontophoe and shorter oesophageal expansion (odontophore 55-64 um, expanded part of oesopahgus about 20% in the type material vs 22-25%)

XIPHINEMA ELONGATUM SCHURMANS-STEKHOVEN AND TEUNISSEN, 1938

Measurements :

Females (n = 16) : L = 2-2 4 (2 3 ± 0 2) mm, a = 59-67 4 (64 5 ± 3 4), b = 6 1-6 8, c = 34 8-41 4 (38 9 ± 3 9), c' = 2 3-2 7, V = 38-41, G1 = 5 3-13 4, G2 = 6 4-17, odontostyle 88-99 (93 4 ± 4 3) um, odontophore 57-59 um, guiding ring 76-101, oeosphagus 351-360 (356 ± 5) um, expanded part of oesophagus 93-104 (98 ± 5) um, nerve ring 179-188 um, cardia 6-9 um, prerectum 301-500 (369 ± 83) um, rectum 31-37 um tail 53-68(59± 6) um, ABD 22-25 um

Male : Not found

Habitat and locality : Soil around roots of banana (***Musa paradisiaca***) trees from Badnekhan Estate, Chikmagalur Distt

Remarks : The present specimens conform well with ***X. elongatum*** Schurmans-Stekhoven and Teunissen, 1938 except in having greater a, c values and storter expanded part of oesophagus (a = 45-59, c = 19-35, expanded part of oesophagus about 20% in the type material vs 26-30%)

XIPHINEMA SIMILLUM LOOF AND YASSIN, 1971

(Fig 13)

Measurements :

Females (n = 9) : L = 2 1-2 5 (2 3 ± 0 2) mm, a = 60-67 (62 8 ± 2 1), b = 5 7-7 (6 3 ± 0 5), c = 20 6-28 (25 ± 3), c' 3 4-5 4 (4 4 ± 0 6), V=27-32 (29 ± 2), G1 = 0 8-1 5, G2 = 7-15 5, odontostyle 90-104 (98 5 ± 7) um,

odontophore 54-62 (58 8 ± 3 1) um, guiding ring 75-109 (86 1 ± 13 2) um, nerve ring 170-200 um, oeosphagus 322-393 (362 ± 26) um, expanded part of oesophagus 92 4-97 (95 ± 2) um, cardia 9-12 um, prerectum 426-544 (478 ± 50) um, rectum 32-38 um, tail 70-110 (92 ± 11) um, ABD 19-24 um

Male : Not found

Habitat and locality : Soil around roots of pepper plants (***Piper nigrum***) from Rayarkoppal, Hassan Distt

Remarks : The present specimens conform well with ***X. simillum*** Loof and Yassin, 1971 except in having greater a value and longer expanded part of oesophagus (a = 56-64, expanded part of oeosphagus 20-25% in the type material vs 25-29%) ***X. simillum*** is reported for the first time from India

XIPHINEMA DIMORPHIS N.SP.

(Fig 13)

Measurements :

Holotype female : L = 2 1 mm, a = 54 1, b = 60, c = 36 1, c' = 2 2, V = 26, G1 = 0 7, G2 = 16 3, oesophagus 345 um, expanded part of oesopahgus 88 um, odontostyle 96 um, odontophore 62 um, prerectum 353 um, rectum 35 um, tail 57 um, ABD 26 um

Paratype females (n = 5) : L = 2 2-2 6 (2 4 ± 0 2) mm, a = 56 7-70 (63 ± 5 4), b = 5 7-7 (6 6 ± 0 6), c = 32 8-44 1 (40 5 ± 5 4), c' = 2 3-2 7 (2 4 ± 0 2), V = 23-29 (25 ± 3), G1 = 0 3-0 7, G2 = 13 8-15, oesophagus 362-390 (370 5 ±13 5) um, expanded part of oesophagus 92-105 (100 ± 6 5) um, odontostyle 96-101 (93 4 ± 2 3) um, odontophore 60-68 (64 ± 4 3) um, prerectum 300-315 um, tail 55-68 (60 8 ± 6 2) um, ABD 24-27 um

Paratype male (n = 1) : L = 2 2 mm, a = 53 1, b = 6 2, c = 37 7, c' = 1 8, spicule 51 um, lateral guiding pieces 10 um, ventromedian supplements 2, odontostyle 99 um, odontophore 68 um; oeosphagus 350 um, expanded part of oesophagus 95 um, rectum 39 um; tail 57 um , ABD 32 um

Description :

Female : Body slightly ventrally arcuate upon fixation, odontostyle often protruded out Cuticle finely, transversely striated, 1-2 um thick at mid-body, 5-7 um at tail Lateral chords about one-third body width wide at midbody, with conspicuous lateral pores Inner cuticle at tail protion with faint radial striations Lip set off by slight depression, amalgamated, rounded, 10-12 um wide, 4-4 5 um high Amphids funnel-shaped, about 9-10 um wide with slit-like apertures Guiding ring 'double', fixed ring located at 82-92 um from anterior end Odontostyle long, attenuated with distinct lumen and aperture Odontophore weakly sclerotized with distinct basal flanges Odontostyle-odontophore junction forked Anterior part of oesopahgus a moderately muscular, tubular structure, often convoluted above expansion Basal expansion abrupt, expanded part occupying about 23-29% of total oesophgeal length Nerve ring surrounds the oesophagus shortly behind the odontophore base Cardia small, often indistinct, about 7-8 um long, bluntly rounded

Reproductive system mono-opisthodelphic Vulva transverse, opening wide, thick walled, vaginal lumen narrow, walls weakly sclerotized, about one-half body width deep. Anterior gonad a very short rudimentary structure lacking any differentiation or sperms Posterior branch normally developed "Z" organ absent Distinct sphincter present at oviduct-uterus junction Uterus often

filled with one or two, long cylindroid eggs Prerectum about 12-13 anal body widths long Rectum about one anal body width long Tail short conoid, dorsally convex, distinctly digitate at the terminus, about 2 3-2 7 anal body widths long with 2-3 caudal papillae on both the sides

Male : Similar to females in general morphology Tail portion more curved Testes not clearly observed due to profuse fatty globules Spicules well developed, dorylaimoid, arcuate, bulky, about 51 um medially Lateral guiding pieces pointed, about 10 um long Supplements an adanal pair and two widely spaced ventromedians Prerectum well above spicular range Tail short conoid, dorsally convex, distinctly digitate, about 1 8 anal body widths long Caudal papillae 3 on each side

Type locality and habitat : Soil around roots of paddy (***Oryza sativa***) near Sringeri, Karnataka State

Type material : Collected in May 1993 Holotype female on slide ***Xiphinema dimorphis*** n sp /1 and paratype females and male on slides ***Xiphinema dimorphis*** n sp /2-4

Relationship : ***Xiphinema dimorphis*** n sp very closely resembles ***X. radicicola*** Goodey, 1936 and ***X. denoudeni*** Loof and Maas 1972 in having mono-opisthodelphic gonads and digitate tail From ***X. radicicola,*** it differs in having greater a value, lesser b, longer tail, shorter prerectum and in the presence of males (a = 35-46, b = 7 2-11 2, c' = 1 4-2 0, prerectum about 15 anal body widths long and males absent in ***X. radicicola***) Further, from ***X. donoudeni*** it differs in the shape and length of tail, shorter anterior uterine branch, greater a,

c' lesser c, V, odontostyle, odontophore, prerectum and in having males (tail short-conoid, very slightly digitate; a = 39-49; c =55-74; c' = 1 2-1.3, V = 32-36; G1 = 2-5; odontostyle 114-126 um; odontophore 69-79 um, prerectum 465-569 or 16-18 anal body widths long and males absent in *X. denoudeni*).

SUPERFAMILY BELONDIROIDEA THORNE, 1939

Belondirids are highly diverse group of nematodes characterised by the thick muscular sheath around the basal expanded part of oesophagus. Thorne (1939) proposed Belondiridae for the flollowing genera, viz., ***Axonchium*** Cobb, 1920; ***Dorylaimellus*** Cobb, 1920 and four new genera, viz., ***Belondira, Oxydirus, Swangeria*** and ***Nygellus***. Because of the muscular sheath around the basal expanded part of oesophagus , ***Nygolaimellus*** was added to this group by Loos (1949). Clark (1961) shifted ***Nygellus*** and ***Nygolaimellus*** to Nygolaimidae Thorne, 1939. Subfamilies Belondirinae, Swangeriinae and Dorylaimellinae were proposed by Jairajpuri (1964 a) along with Nygellidae for ***Nygellus*** and ***Nygolaimellus***. Belondiridae was riased to superfamilial rank by Thorne (1964) and six families were proposed under it. Siddiqi (1968) included eight families, viz., Belondiridae, Roqueidae, Oxydiridae, Mydonomidae, Axonchiidae, Swangeriidae, Falcihastidae and Nygellidae. He (l.c.) synonymised Falcihastidae and Nygellidae with Belondiridae and Nygolaimellidae respectively. Ferris (1971) regarded Dorylaimellidae and Nygellidae as valid. Yeates (1973) while proposing the genera ***Mitoaxonchium*** and ***Helicobelondira***, accepted Mydonomidae and Falcihastidae as valid. Nair and Coomans (1973, 1974) and Mulk, Coomans and Baqri (1978) considered Belodiridae as a family under Dorylaimoidea. But Andrássy (1976) recognised it as a superfamily with the following families, viz., Belondiridae, Swangeriidae, Oxydiridae, Dorylaimellidae and Roqueidae. Axonchiidae and Falcihastidae were considered only as subfamilies of Sawngeriidae and Roqueidae respectively by Andrássy in the

same year. He (l.c) shifted ***Mydonomus*** to Dorylaimoididae and ***Bullaenema*** to Tylencholaimidae. While proposing the genus ***Paraoxydirus***, Jairajpuri and Ahmad (1980) recognised only Belondiridae, Dorylaimellidae and Swangeriidae and two subfamilies Swangeriinae and Roqueinae In the same year, they (l c) split ***Dorylaimellus*** into nine subgenera The genus ***Tarjanius*** was proposed by Ferris, Goseco and Ferris (1980) They (l c) revised the genus ***Oxydirus*** and shifted ***Oxydiroides*** to Prodorylaimidae Later they synonymised ***Tarjanius*** with ***Paraoxydirus*** Ferris, Ferris and Goseco (1983) while revising the genus ***Belondira*** added several new species

Five of the subgenera of ***Dorylaimellus,*** viz , ***Mesodorylaimellus, Metadorylaimellus, Axodorylaimellus, Belondorylaimellus*** and ***Elongidorylaimellus*** were raised to generic level by Siddiqi (1983a) ***Prodorylaimellus*** was synonymised with ***Dorylaimellus, Filidorylaimellus*** and ***Clavidorylaimellus*** with ***Elongidorylaimellus*** and six new genera, viz , ***Capitellus, Rashidanema, Ibadanus, Sindellus, Amazonema*** and ***Jamilius*** were proposed by by Siddiqi (l.c.).

Jairajpuri and Ahmad (1992) though were inclined with the views of Nair and Coomans (1973, 1974) and Mulk, Coomans and Baqri (1978) that the validity of Belondiroidea as a superfamily is doubtful but still retained it as a superfamily and only the family Bedondiridae with Belondirinae, Dorylaimellinae and Sawangerinae as subfamilies In the present study, almost all soil samples that were collected from the various localities of Malnad tracts yielded one or the other species of belondirid which shows that this is a widely distributed group in the area. Two new genera, two new subgenera and several new species were collected and are being reported in this work.

Though the validity of Belondiroidea has been doubted by several workers, it has been considered valid in this study because apart from the muscular sheath around the expanded part of oesophagus the group has several distinct characters, viz., varied male reproductive structures, spear, amphid, cardia and tail Jairajpuri and Ahmad's (1992) classification of Belondiroidea is accepted in the present work.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region narrow, small, angular or rounded. Odontostyle generally small, odontophore simple, rod-like or sometimes flanged at the base. Basal expanded part of oesophagus enveloped by thick sheath of muscles, usually with spiral, rarely longitudinal bands. Female reproductive system monodelphic or amphidelphic Ventromedian supplements few to numerous Tail shapes highly variable; similar or dissimilar in sexes.

Type and only family :

Belondiridae Thorne, 1939

FAMILY BELONDIRIDAE THORNE, 1939

Diagnosis : (After Jairajpuri and Ahmad, 1992).Lip region narrow, continuous or set off from the body contour. Odontostyle usually small, linear or fusiform with distinct aperture either narrow or wide Odontophore simple, rod-like or flanged at the base. Junction of anterior narrow part and posterior expanded part of the oesophagus continuous or separated by distinct isthmus-like constriction. Basal expanded part of oesophagus greatly variable in structure, size and musculature. Cardia short, conoid to elongate, isthmus-like. Female reproductive system monodelphic or amphidelphic.

Vulva transverse or longitudinal. Spicules highly variable in size and shape. Ventromedian supplements few to numerous. Tails short, bluntly rounded to long filiform, smiliar or dissimilar in sexes.

Type subfamily :

Belondirinae Thorne, 1939

Other subfamilies :

Dorylaimellinae Jairajpuri, 1964

Swangeriinae Jairajpuri, 1964

SUBFAMILY BELONDIRINAE THORNE, 1939

Diagnosis : (Emended). Lip region continuous or set off from the body contour. Odontostyle linear or fusiform with distinct aperture. Odontophore simple rod-like, rarely with minute knobs. Anterior slender part and posterior expanded part of the oesophagus either continuous or set off by constriction. Female reproductive system mono-opisthodelphic or amphidelphic. Spicules variable in structure and size with different types of lateral guiding pieces. Tails short-conoid to bluntly rounded, often clavate due to expansion of cuticle; similar in sexes.

Type genus :

Belondira Thorne, 1939

Other genera :

Axonchium Cobb, 1920

Belondirella Thorne, 1964

Axonchoides Thorne, 1967

Anchobelondira Nair and Coomans, 1971

Dactyluraxonchium (Coomans and Nair, 1975) Jairajpuri and Dhanachand, 1979

Heynsaxonchium (Coomans and Nair, 1975) Jairajpuri and Dhanachand, 1979.

Nimigula Andrássy, 1985

Amphibelondira Rahman, Jairajpuri, Ahmad and Ahmad, 1987

GENUS *BELONDIRA* THORNE, 1939

In the year 1939, Thorne proposed the genus ***Belondira*** with ***B. apitica*** as its type species. This is a commonly occurring genus in India and also all over the world. ***Belondira*** is characterized in having a generally smaller body, straight to slightly ventrally curved body posture, rounded lip region without elevated papillae, weakly to moderately sclerotized cephalic framework, small odontostyle, expanded part of oesophagus surrounded by muscular sheath, mono-opisthodelphic reproductive system and bluntly rounded to clavate tails in both sexes. Several workers have described some 43 species under this genus including the three new species described in the present work. Soil samples collected from different localities of Malnad tracts yielded 4 known and 3 new species of ***Belondira*** which are described and illustrated. ***B. ortha*** Thorne, 1939 and ***B. tarjani*** Ferris, Ferris and Goseco, 1983 are reported here for the first time from India.

Diagnosis : (Emended). Body generally small, almost straight to slightly arcuate ventrally upon fixation. Lip region rounded, continuous or set off by

slight depression, papillae not raised. Outer part of cephalic framework weakly to moderately sclerotized. Amphids usually wide, fovea simple or duplex. Odontostyle narrow, usually less than lip width, weakly to moderately sclerotized. Guiding ring single in most species, obscure. Odontophore simple rod-like, rarely with minute knobs at the base. Anterior slender part of oesophagus expanding below ellipsoidal swelling then gradually narrowing until it forms basal expanded part. Basal expanded part long, cylindroid or short-pyriform, encircled by thick sheath of spiral muscle bands. Cardia conoid or rounded. Female reproductive system mono-opisthodelphic, anterior branch absent or present. Vulva transverse, opening wide. Males with dorylaimoid spicules, lateral guiding pieces and few widely spaced ventromedian supplements. Tails short, rounded to clavate due to thickening of cuticle; similar in sexes.

Type species :

Belondira apitica Thorne, 1939

Other species :

There are some 43 species of ***Belondira*** including the following recent inclusions and new species.

B. neosacca Gambhir and Dhanachand, 1992

B. imphalensis Gambhir and Dhanachand, 1992

B. sharatum Gambhir and Dhanachand, 1992

B. musae Gambhir and Dhanachand, 1992

B. beluri n.sp.

B. paratumicauda n.sp.

B. ovatum n.sp.

For the list of species refer Jairajpuri and Ahmad (1992).

BELONDIRA NEPALENSIS SIDDIQI, 1964

Measurements :

Females (n = 8): L = 1 0 - 1 2 mm, a = 41 2 -43 4, (42 1 ± 1 0), b = 5 - 5 2 (5 1 ± 0 1), c = 42 3 - 58 8 (47 2 ± 8), c' = 1 1-1 5 (1 3 ± 0 2), V =33 - 36, G1 = 1 7 - 5 3, G2 = 14 0 - 19, odontostyle 3 - 4 um, odontophore 7 - 8 um, oesophagus 191 - 206 (198 5 ± 7) um, expanded part of oesophagus 81 - 94 (87 5 ± 6 2) um, nerve ring 73 - 76 um, cardia 7 - 8 um, prerectum 66 - 110 (84 5 ± 19 5) um, rectum 16 - 18 um, tail 18 - 25 (22 ± 3 2) um, ABD 16 - 18 um

Males (n = 2): L = 0 94 - 0 96 mm, a = 45 - 45 6, b = 4 8, c = 49 1 - 54 4, c' = 1 1 - 1 2, T = 36 - 43, spicule 23 5 - 26 5 um, lateral guiding pieces 6um, ventromedian supplement 1, odontostyle 4 um, odontophore 12 um, oesophagus 196 - 200 um, expanded part of oesophagus 81 - 82 um, nerve ring 75-78 um, cardia 7 5 - 9 um, prerectum 81 - 88 um, rectum 31 um, tail 18 - 19 um, ABD 16 um

Habitat and locality : Soil around roots of shade trees (unidentified) from Hoovincadoo Estate, Kodagu Distt

Remarks : The present specimens conform well with the original description of ***Belondira nepalensis*** Siddiqi, 1964 except in having shorter expanded part of oesophagus , spicules and number of ventromedian supplements (basal expanded part of oesophagus 51% vs 33 - 43%, spicule 30 - 32 um and ventromedian supplements 2 in the type material)

BELONDIRA ORTHA THORNE, 1939

Measurements :

Females (n = 3) : L = 1 5 - 1 8 mm, a = 38 - 42, b = 4 2 - 5 0, c = 70 - 101, c' = 0 6 - 0 9, V = 33 - 41 5, G1 = 3 6 - 6, G2 = 9 7 - 14, odontostyle 5 - 6 um, odontophore 15 - 18 um, guiding ring 6 um, oesophagus 354 - 384 um, expanded part of oesophagus 196 - 229 um, nerve ring 94 - 103 um, cardia 11 - 15 um, prerectum 150 - 166 um, rectum 27-38 um, tail 18-21 um, ABD 23 5 - 28 um

Males (n = 2) : L = 1 5 - 1 6 mm, a = 43 - 45, b = 4 2 - 4 7, c = 74 - 77, c' = 0 8 - 0 9, T = 50 - 57, spicule 32 - 35 um, lateral guiding pieces 7 - 8 um, ventromedian supplements 1 - 2, odontostyle 6 um, odontophore 15 - 16 um, guiding ring 6 um, nerve ring 97 - 100 um, oesophagus 323 - 375 um, expanded part of oesophagus 179-219 um, cardia 10 - 13 um, prerectum 176 - 206 um, rectum 32 - 35 um, tail 21 um, ABD 23 5 - 25 um

Habitat and locality : Soil around roots of citrus plants (***Citrus reticulata***) from Connoncadoo Estate, Kodagu Distt

Remarks : The present specimens conform well with ***Belondira ortha*** Thorne, 1939 except in having longer odontophore , slender body and shorter testes (odontophore 11 um, a = 36 - 39 and T = 39 in the type material) ***Belondira ortha*** Thorne 1939 is reported for the first time from India

BELONDIRA TARJANI FERRIS, FERRIS AND GOSECO, 1983

Measurements :

Female (n = 6) : L = 0 8 - 1 0 (0 9 ± 0 1) mm, a = 40 - 42, b = 4 6 - 5 1 (4 9 ± 0 2), c = 44 6 - 55 6 (51 1 ± 4 7), c' = 1 0 - 1 4, V = 34 - 35, G1 = 1 1 - 1 8, G2 = 8 7 - 15 7, odontostyle 4-5 um, odontophore 11-12 um, oesophagus 170 - 194 (184 ± 10) um, basal expanded part of oesophagus 76 - 88 (79 4 ± 6) um, nerve ring 63 - 72 um, cardia 6 - 9 um, prerectum 54 - 75 (64 ± 9) um, rectum 25 - 29 um, tail = 15 - 22 (16 4 ± 2 5) um, ABD 15 - 16 um

Male : Not found

Habitat and locality : Soil around roots of betel vine from Thirthalli, Shimoga Distt Karnataka state

Remarks : The present specimens conform well with the original description of ***B. tarjani*** Ferris, Ferris and Goseco, 1983 except for having shorter oesophagus , tail and longer odontophore (oesophagus 202-252 um, tail 21 - 24 um, odontophore 8 um in the type material) ***B. tarjani*** is reported for the first time from India

BELONDIRA TENUIDORA AHMAD, DHANACHAND AND JAIRAJPURI, 1982

Measurements :

Female (n = 1) : L = 1 6 mm, a = 56 6, b = 6 2, c = 35 8, c' =1 8, V = 40, G1 = 3 3, G2 = 8 2, odontostyle 6 um, odontophore 10 um, guiding ring 6 um, oesophagus 254 um, expanded part of oesophagus 88 um, nerve ring 88 um, cardia 16 um, prerectum 62 um, rectum 24 um, tail 44 um, ABD 25 um

Male : Not found

Habitat and locality : Soil around roots of coffee plants (***Coffea arabica***) from CRS farm, Chikmagalur Distt

Remarks : The present specimens conform well with ***B. tenuidora*** Ahmad *et al.* 1982 except in having greater a value, longer tail, shorter odontostyle and in the absence of males (a = 39 - 50, tail 33 - 38 um, odontostyle 8 - 9 um and males present in ***B. tenuidora***) The present female specimen, however, shows anterior sexual branch that is full of sperms

BELONDIRA BELURI N.SP.

(Fig 14)

Measurements :

Holotype female : L = 1 9 mm, a = 41 0, b = 4 2, c = 86, c' = 0 6, V = 36, G1 = 1 6, G2 = 13 2, odontostyle 7 5 um, odontophore 18 um, oesophagus 448 um, basal expansion of oesophagus 272 um, prerectum 168 um, rectum 37 um, tail 22 um, ABD 35 um

Paratype females (n = 4) : L = 1 7 - 1 9 (1 8 ± 0 1) mm, a = 36 4 38 3 (37 8 ± 1 0), b = 3 7 ± 4 1 (4 0 ± 0 2), c = 75 2 - 93 (85 7 ± 7 5), c' = 0 6, V = 35 - 41 3 (38 ± 2 4), G1 = 1 2 - 1 8, G2 = 10 - 15 5, odontostyle 7 - 7 5 um, odontophore 17 - 18 um, oesophagus 445 - 466 (455 7 ± 8 4) um, basal expansion of oesophagus 267 - 296 (282 6 ± 11 5) um, prerectum 147 - 169 (156 ± 9 2) um, rectum 34-37 um, tail 21 - 22 um, ABD 34 - 35 um

Description :

Female : Body moderate, almost straight upon fixation, cylindroid, tapering gradually in the anterior portion Cuticle finely, transversely

striated Lateral chords about one-third body width wide at midbody Lip region set off by narrowing, truncated, amalgamated, 9 - 12 um wide, 5 - 7 um high Papillae prominent Cephalic framework strong Guiding ring single, located at 6 - 7 5 um from anterior end Amphids cup-shaped, about 4 - 6 um wide, apertures slit-like Odontostyle less than lip width long, slightly fusiform with distinct lumen and aperture Odontophore about 2 4 odontostyle lengths long, simple, rod-like Anterior part of oesophagus a tubular structure Junction of anterior and posterior part of oesophagus continuous Basal expanded part occupying about 60 - 63% of total oesophageal length, enclosed in a thick sheath of spiral muscles DN at some distance from DO Cardia short, tongue-shaped, about 17-19 um long Nerve ring located at 126-128 um from anterior end

Female reproductive system mono-opisthodelphic Vulva transverse, opening very wide Vagina thick-walled, almost globular, extending about two-fifths corresponding body width deep Anterior gonad reduced to a short sac without sperms or differentiation Posterior branch normal Uterus short Weakly developed sphincter present at oviduct-uterus junction Oocytes arranged in a single line except near tip Prerectum about 4 2 - 4 8 anal body widths long Rectum equals to one anal body width Tail less than one anal body width long, slightly broader than the adjoining part of body, broadly rounded Caudal pores two on each side

Male : Not found

Type locality and habitat : Soil around roots of wild trees (unidentified) from the Belur Zone of Karnataka state

Type material : Collected in March 1993 Holotype female on slide ***Belondira beluri*** n sp /1 and paratype females on slides ***Belondira beluri*** n sp /2-4

Relationship : ***Belondira beluri*** n sp closely resembles ***B. apitica*** Thorne, 1939, ***B. syedi*** Suryawanshi, 1972 and ***B. goldeni*** Suryawanshi, 1972 From ***B. apitica,*** it differs in the greater V, shorter anterior uterine branch, prerectum, longer oesophagus, expanded part of oesophagus, tail, shorter odontostyle and in the absence of males (a = 39 2 - 46 4, V = 32 - 36, G1 = 3 - 6, odontostyle 7 - 9 um, oesophagus 385 - 518 um, basal expansion 50 - 56%, prerectum 5 - 6 anal body widths long, tail 16 - 18 um and males present in ***B. apitica***) Further, it can be differentiated from ***B. syedi*** in having shorter tail, much longer odontophore , shorter basal expansion of oesophagus and prerectum (tail about one-half anal body widths long, odontophore 7 - 8 um, basal expansion of oesophagus about 70% and prerectum 3 anal body widths long in ***B. syedi***) It can further be differentiated from ***B. goldeni*** in having longer body, tail, odontophore, basal expansion of oesophagus, greater c and in the absence of males (L = 1 48 - 1 67 mm, b = 4 3 - 4 6, c = 48 5 - 59, tail about one anal body width long, odontophore 5 - 7 um, basal expansion 57% and males present in ***B. goldeni***)

BELONDIRA PRATUMICAUDA N.SP.

(Fig 15)

Measurements :

Holotype female : L = 1 1 mm, a = 43 9, b = 6 2, c = 20 7, c' = 2 8, V = 33, G1 = 2 9, G2 = 12 1, odontostyle 3 um, odontophore 8 um, oesophagus 178 um, basal expansion 68 um, prerectum 81 um, rectum 22 um, tail 53 um, ABD 19 um

Paratype females (n = 3) : L = 0 9 - 1 1 mm, a = 42 5 - 44, b = 5 7 - 6 2, c = 20 3 - 21 2, c' = 2 5 - 2 8, V = 33 - 36, G1 = 2 8 - 3 9, G2 = 9 4 - 12 3, odontostyle 3 um, odontophore 7 5 - 8 um, oesophagus 164 - 178 um, basal expansion 60 - 69 um, prerectum 60 - 77 um, rectum 21 - 22 um, tail 44 - 53 um, ABD 18 - 19 um

Description :

Female : Body almost straight upon fixation, tapering gradually towards anterior end Cuticle finely, transversely striated, more prominently in the caudal region, 1 - 1 5 um thick at midbody and 20 - 25 um at tail region At tail region, outer cuticle extremely expanded, fin-like Lateral chords about one-fourth body width wide at midbody Lip continuous, amalgamated, rounded, 6 - 7 um wide, 4 um high Cephalic sclerotization indistinct Amphids cup-shaped, duplex, apertures slit-like, about 4 um wide Odontostyle very short, less than one-half lip width long, weakly sclerotized with narrow lumen and aperture Odontophore about 2 5 odontostyle lengths long, base with very minute knobs Anterior part of oesophagus a slender tubular structure Basal expanded part pyriform, occupying 37 - 39% of total oesophageal length, enveloped in a thick sheath of spiral muscular bands DN at 71-74% of neck length Nerve ring located at 73-79 um from anterior end Cardia short, tongue-shaped, about one-half corresponding body width long

Reproductive system mono-opisthodelphic Anterior uterine branch a short sac about 28 - 41 um long, full of spindle-shaped sperms Vulva transverse, typical of the genus, opening very wide Vagina thick walled Posterior sexual branch normally developed Uterus short, sphincter present at oviduct-uterus junction Prerectum 3 4 -4 anal body widths long

Rectum about one anal body width long. Tail distinctly clavate due to expansion of outer cutice, radilly striated, about 2.5 - 2.8 anal body widths long. Caudal pores two on each side. Non-protoplasmic terminal portion of the tail measures about 20 - 25 um.

Male : Not found.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) from Balehonnur, Karnataka state.

Type material : Collected in March 1993. Holotype female on slide ***Belondira paratumicauda*** n.sp./1 and paratype females on slides ***Belondira paratumicauda*** n.sp./2-4.

Relationship : ***Belondira paratumicauda*** n.sp. closely resembles ***B. tumicauda*** Coomans and Baqri, 1972 in its general body structure and in the shape of tail. But it distinctly differs from the latter in having shorter oesophagus, higher b, V values, shorter basal expanded part of oesophagus, anteriorly located nerve ring, longer prerectum, lack of cephalic sclerotization and in the presence of minute knobs at odontophore base (oesophagus 220 - 246 um; expanded part of oesophagus 95 - 109 um; b = 4.2 - 4.8; V = 40 - 41; nerve ring at 90 um; prerectum 53 um, cephalic sclerotization prominent and basal knobs absent at odontophore base in ***B. tumicauda***).

BELONDIRA OVATUM N.SP.

(Fig 14)

Measurements :

Holotype female: L = 0 9 mm, a = 36 3, b = 5 1, c = 37 5, c' = 1 2, V = 33, G1 = 12 9, G2 = 21 7, odontostyle 3 um, odontphore 7 um, oesophagus 169 um, expanded part of oesophagus 110 um, prerectum 96 um, rectum 22 um, tail 23 um, ABD 19 um

Paratype females (n = 5) : L =0 9 mm, a = 36-38 5 (37 4±1 0), b =4 2-5 0 (4 7 ± 0 33), c = 40 - 41, c' = 1 2 - 1 3, V = 35 - 36, G1 = 8 7 - 14 5 (11 7 ± 2 7), G2 = 15 - 25 7 (19 ± 4 4), odontostyle 3 - 4 um, odontophore 7 - 8 um, oesophagus 175 - 200 (189 4 ± 13 2) um, expanded part of oesophagus 98 5 - 118 (109 4 ± 10) um, prerectum 68 - 96 (80 6 ± 14 2) um, rectume 22 - 25 um, tail 21 - 22 um, ABD 17 - 18 um

Paratype males (n = 2) : L = 0 8 - 0 9 mm, a = 41 7, b = 4 6 - 4 7, c = 40 - 41 6, c' = 1 3 - 1 4, T = 59 - 63 5, spicule 24 - 25 um, lateral guiding pieces 6 um, ventromedian supplements 2, odontostyle 3 um, odontophore 8-9 um, oesophagus 181-185 um, basal expansion 104-110 um, prerectum 81 - 96 um, rectum 29 - 31 um, tail 20 5 - 22 um, ABD 16 - 17 um

Description :

Female : Body small, about 1 mm long, almost straight upon fixation Cuticle finely, transversely striated Lateral chords about one-fourth body width wide at midbody Lip continuous, amalgamated, rounded Cephalic framework weakly developed Amphids stirrup-shaped, more than one-half lip width wide, apertures slit-like Odonstostyle very short, about one-half lip width long Odontophore slightly more than two odontostyle

lengths long, simple, rod-like. Guiding ring obscure. Anterior part of oesophagus a slender tubular structure, often convoluted above the point of expansion. Basal expanded part of oesophagus a long pyriform, moderately muscular structure, occupying about 56 - 59% of total oesophageal length, enclosed in a thick sheath of spiral muscles. Nerve ring located at 57 - 74 um from anterior end. Oesophago-intestinal junction indistinct due to pushing of eggs in the anterior-uterine sac.

Female reproductive system mono-opisthodelphic. Vulva transverse, opening very wide. Vagina thick walled. Anterior uterine branch often filled with long cylindrical egg which pushes the oesophagus base and hence makes it convoluted at the point of expansion. Eggs about 93 - 104 um long and 18 - 21 um wide. Posterior gonad normally developed. Uterus short. Sphincter obscure at oviduct-uterus junction. Prerectum about 3.8 - 5.2 anal body widths long. Rectum slightly more than one anal body widths long. Tail short, about 1.2 - 1.3 anal body widths long, clavate due to thickening of cuticle, appears radially striated. Caudal pores two on each side.

Male : Similar to females except in having more curved posterior part Tail looks hooked due to depression made by caudal papilla. Testes paired, outstretched, about 59 - 63.5% of total body length. Spicules small, arcuate, about 25 um long medially. Lateral guiding pieces short, about one-fourth spicular length long. Supplements an adanal pair and two widely spaced ventromedians Tail similar to females, clavate, about 1.3 - 1.4 anal body widths long. Caudal pores two on each side.

Type locality and habitat : Soil around roots of bamboo bushes (***Bamboosa*** sp.) from Aagombe forest, Karnataka state.

Type material : Collected in March 1995. Holotype female on slide ***Belondira ovatum*** n.sp./1 and paratype females and males on slides ***Belondira ovatum*** n.sp./2-4.

Relationship : ***Belondira ovatum*** n.sp. distinctly differs from all the other species in the presence of large eggs in the anterior uterine branch. It comes closer to ***B. rafiqi*** Suryawanshi, 1972 and ***B. parva*** Thorne, 1939. It differs from ***B. rafiqi*** in having lesser c, V values, longer anterior uterine branch and basal expansion of oesophagus (c = 45 - 59; V = 37 - 40; G1 = 3 - 5; basal expanded part 83-88 um in ***B. rafiqi***). Further, it differs from ***B. parva*** in having lesser a, c values, longer oesophagus and expanded part of oesophagus, greater V, G1 values and shorter odontophore (a = 41.5; c = 44.8; V = 33.7; G1 = 1.2; oesophagus 163 um; expanded part of oesophagus 72 um and odontophore 13 um in ***B. parva***).

GENUS *AXONCHIUM* COBB, 1920

The genus ***Axonchium*** was proposed by Cobb (1920) with ***A. amplicolle*** as its type species. Since then, several workers added a large number of species to this genus. Coomans and Nair (1975) split the genus into nine subgenera, viz., ***Axonchium, Metaxonchium, Epaxonchium, Discaxonchium, Dactyluraxonchium, Hypaxonchium, Poraxonchium, Heynsaxonchium*** and ***Syncheilaxonchium***.Jairajpuri and Dhanachand (1979) raised ***Dactyluraxonchium*** and ***Heynsaxonchium*** to generic level. Another subgenus ***Spiculaxonchium*** was added by Ahmad and Jairajpuri (1982). In the present study the genus ***Phallaxonchium*** that was proposed by Jairajpuri and Dhanachand (1978) is also considered to be a subgenus of ***Axonchium*** since variations in spicular structure and size are quite common in ***Axonchium***. Except spicular shape and size, other morphological characters of ***Phallaxonchium*** are very similar to ***Axonchium*** and its placement as subgenus seems justified. A new subgenus resembling ***Phallaxonchium*** is also described in the present work. It has been observed that the subgenus ***Axonchium*** is quite prevalent in the Malnad tracts. The diagnosis of ***Axonchium*** is provided below.

Diagnosis : (Emended). Body small to large-sized. Upon fixation, body attains almost straight to open "C" shaped posture. Lip continuous or set off, amalgamated or partially separate, high, conoid to rounded. Amphids stirrup or cup-shaped, about two-thirds of lip width wide, apertures slit-like. Odontostyle moderate, fusiform, with wide lumen and aperture. Guiding ring single or 'double'. Odontophore simple, rod-like, walls thickened, generally equal to

odontostyle length or slightly more. Anterior part of oesophagus usually slender, fusiform, enlarged region may be seen just above nerve ring, junction of anterior and posterior expanded part separated by isthmus-like constriction. Basal expanded part generally very long, moderate to strongly muscular, enclosed in straight band of muscles. Dorsal oesophageal gland nucleus conspicuous, other nuclei indistinct due to thick muscular sheath. Female reproductive system mono-opisthodelphic, anterior uterine branch rudimentary to moderately long sac or absent. Vulva transverse, rarely longitudinal or oval, sclerotized or muscular. Vagina usually wide with longitudinally striated walls, may be distinctly sclerotized, rarely inclined posteriorly, long and distinct sphincter muscles on the walls. Posterior gonad normally developed. Males with well developed, massive, straight to ventrally arcuate spicules, rarely very long and attenuated. Lateral guiding pieces highly variable in shape, sclerotized. Supplements few to numerous, contiguous or spaced. Testes enclosed in simple or oblique band of muscular sheath. Tails hemispherical to conoid, rarely slightly clavate; similar in sexes.

Type subgenus :

Axonchium Cobb, 1920

Other subgenera

Discaxonchium Coomans and Nair, 1975

Epaxonchium Coomans and Nair, 1975

Hypaxonchium Coomans and Nair, 1975

Metaxonchium Coomans and Nair, 1975

Poraxonchium Coomans and Nair, 1975

Syncheilaxonchium Coomans and Nair, 1975

Phallaxonchium Jairajpuri and Dhanchand, 1978 n.rank.

Spiculaxonchium Ahmad and Jairajpuri, 1982

Uniqaxonhium N. subgen.

SUBGENUS *AXONCHIUM* COBB, 1920

The subgenus ***Axonchium*** Cobb, 1920 was saperated from the genus ***Axonchium*** Cobb, 1920 by Coomans and Nair (1975) with its type species ***A. (A). amplicolle***. Several workers have reported a number of species under this subgenus. In the presnet work 5 known and 3 new species of ***Axonchium*** are reported. ***A. heynsi*** is the first record from India. Apart from the systematic studies, muscular sheath surrounding the testes of male specimens was studied in detail and the first report and new species were described and illustrated.

Diagnosis (Emended) : Body small to moderate-sized, rarely large-sized, straight to ventrally arcuate upon fixation. Lip region set off, lips conoid with inner sections amalgamated or partially separated. Odontostyle fusiform, moderately to strongly sclerotized, lumen and aperture wide. Odontophore simple, rod-like, weakly sclerotized. Guiding ring single. Anterior part of oesophagus moderately muscular, junction with posterior expanded part either abutting or separated by short isthmus-like constriction. Basal expanded part moderate to very long, muscular, enclosed in straight band of thick muscle sheath. Cardia variable in shape and length, bluntly conoid to rounded or

tongue-shaped. Oesophago-intestinal junction often with overlapping of intestine at the base. Vulva almost equatorial, transverse, sclerotized or muscular. Vagina variable in shape, vaginal walls not sclerotized Female tail broadly rounded, convex conoid to short cylindroid, or slightly clavate due to expansion of cuticle Males with variable shapes and sizes of spicules, often strongly sclerotized Lateral guiding pieces well developed, tip blunt or bifed Ventromedeian supplements few to numerous, contiguous or spaced Testes enclosed in thick sheath of muscles either with oblique bands or plain Male tail similar to females.

Type species :

Axonchium (Axonchium) amplicolle Cobb, 1920

Other species :

There are about 27 species described so far including the following additions :

A. dubium Siddiqi, 1995

A. perplexus Siddiqi, 1995

A. (A.) cooverkolli n.sp.

A. (A.) hosakodii n.sp.

A. (A.) camelliae n.sp.

For the list, see Jairajpuri and Ahmad (1992).

AXONCHIUM (AXONCHIUM) AMPLICOLLE COBB, 1920

Measurements :

Females (n = 11) : L = 1 9 - 2 2 (2 03 ± 0 11) mm, a = 35 - 39 (37 5 ± 1 8), b = 2 4 - 2 8 (2 6 ± 0 2), c = 65 - 82 (71 1 ± 7 4), c' = 0 6 - 0 8, V = 53-56 (54 5 ± 1 1), G1 = 0 9 - 1 6, G2 = 10 - 18, odontostyle 12 - 13 um, odontophore 15 - 16 um, oesophagus 778 - 831 (799 ± 23 2) um, expaned part of oesophagus 522 - 570 (543 3 ± 21 3) um, cardia 25 - 40 um, nerve ring 150 - 159 um, prerectum 110-203 (163 ± 40) um, rectum 40-43 um, tail 25-32 (28 7 ± 2 8) um, ABD 38 - 40 um

Male : Not found

Habitat and locality : Soil around roots of dadap plants (***Erythrina lithospherma***) from Mallundur

Remarks : The present specimens conform well with the description of *A. (A.) amplicolle* Cobb, 1920 except in having slightly greater a value, longer rectum and shorter prerectum (a = 40 - 45, rectum 31 - 33 um and prerectum 224 - 250 um in the Indian population of *A. (A.) amplicolle*)

AXONCHIUM (AXONCHIUM) SACCATUM JAIRAJPURI, 1964

Measurements :

Females (n = 9) : L = 1 7 - 2 0 (1 8 ± 0 2) mm, a = 36 - 47 (42 8 ± 1 4 9), b = 2 8 - 3 0 (2 9 ± 0 1), c = 76 - 84 (77 9 ± 4), c' = 0 7 - 0 8, V = 50 - 54 (51 ± 2 3), G1 = 5 - 8, G2 = 11 - 18, odontostyle 12 - 13 um, odontophore 13 um, oesophagus 581 - 695 (629 5 ± 47 9) um, expanded part of oesophagus 357 - 431 (386 ± 31) um,

cardia 15 - 21 um, nerve ring 132 - 151 um, prerectum 206 - 272 (229 7 ± 29 6) um, rectum 32 - 44 um, tail 22 - 24 um, ABD 29 - 31 um

Males (n = 3) : L - 2 1 mm, a = 48 - 50, b = 3 3 - 3 7, c = 73 - 78, c' = 0 9, T = 50 - 57, spicule 45 - 46 um, lateral guiding pieces 12 - 13 um, ventromedian supplements 6 - 8, odontostyle 9 - 10 um, odontophore 13 - 14 um, oesophagus 541 - 628 um, expanded part oesophagus 282 - 368 um, cardia 12 - 19 um, nervering 132 - 143 um, prerectum 331 - 463 um, rectum 46 - 47 um, tail 26 - 28 um, ABD 29 - 31 um

Habitat and locality : Soil around roots of common weeds (***Oxalis*** sp) from Green Field Estate, Kodagu

Remarks : The present specimens conform well with the description of ***A. (A.) saccatum*** Jairajpuri, 1964 except in having slender body, shorter tail and prerectum (a = 33 - 34, c = 94 - 95 and prerectum 355 - 370 um in ***A. (A.) saccatum***) Further, it is observed that the muscular sheath enclosing the testes of males measure about 4 um thick with oblique bands, more prominently on the testes than on vas deferens

AXONCHIUM (AXONCHIUM) HEYNSI NAIR, 1973

(Fig 18)

Measurements :

Females (n = 13) : L = 1 5 - 2 3 (2 0 ± 0 4) mm, a = 34 - 48 5 (41 9 ± 6) um, b = 2 4 - 3 6 (3 ± 0 5), c = 66 - 76 5 (71 3 ± 4 5), c' = 0 7 - 1 0 (0 83 ± 0 1), V = 46 - 57 (51 9 ± 4 4), G1 = 1 4 - 6 5, G2 = 10 - 14 5, odontostyle 10 - 11 um,

odontophore 13 um, oesophagus 626 - 709 (665 ± 41) um, expanded part of oesophagus 379 - 456 (416 ± 42) um, cardia 13 - 19 um, nerve ring 135 -150 um, prerectum 178 - 346 (293 ± 77) um, rectum 29 - 41 um, tail 21 - 34 (28 3 ± 5 6) um, ABD 31 - 35 um

Males (n = 15) : L = 1 9 - 2 3 (2 0 ± 0 2) mm, a = 43 - 52 (46 9 ± 3 8), b = 3 2 - 4 1 (3 6 ± 0 4), c = 54 6 - 69 6 (60 4 ± 5 5), c' = 0 9 - 1 0, T = 49 - 54, spicule 44 - 46 um, lateral guiding pieces 14 - 15 um, ventromedian supplements 6 - 7, odontostyle 10 - 11 um, odontophore 13 um, oesophagus 551 - 591 (568 ± 20) um, expanded part of the oesophagus 309 - 360 (367 ± 23) um, cardia 12 - 15 um, nerve ring 137 - 154 um, prerectum 338-412 (375 ± 34 5) um, rectum 44 - 49 um, tail 32 - 35 um, ABD 32 - 35 um

Habitat and locality : Soil around roots of coconut trees from Brindavan Estate, Chikmagalur Distt

Remarks : The present specimens conform well with ***A. (A.) heynsi*** Nair, 1973 except in having slightly shorter basal expanded part of oesophagus and prerectum (expanded part of oesophagus 346 - 664 um, prectum 360 - 517 um in females and 445 - 651 um in males in the type material) Further, detailed study of the muscular sheath enclosing the testes showed that the sheath measures about 3 5 - 4 5 um with oblique bands more prominent on the testes than on vas deferens ***A. (A.) heynsi*** is reported for the first time from India

AXONCHIUM (AXONCHIUM) ELEGANS JAIRAJPURI, 1964

Measurements :

Females (n = 6) : L = 1 5 - 1 7 (0 6 ± 0 1) mm, a = 53 - 55 (53 9 ± 1 0), b = 2 7 - 2 9 (2 8 ± 0 9), c = 80 - 84 (81 8 ± 2 2), c' = 0 8 - 0 9, V = 52 - 56, G1 = 6 5 - 7 5, G2 = 10 - 14, odontostyle 9 - 10 um, odontophore 10 um, oesophagus 545 - 595 (575 ± 22) um, expanded part of oesophagus 331-397 (361 ± 27) um, cardia 12 - 13 um, nerve ring 110 - 121 um, prerectum 191 - 257 (213 ± 31) um, rectum 23 - 28 um, tail 19 - 21 um, ABD 22 - 24 um

Males (n = 2) : L = 1 3 - 1 6 mm, a = 38 - 54, b = 2 6 - 3 9, c = 59 - 81 5, c' = 0 9 T = 51 - 52, spicule 34 - 35 um, lateral guiding pieces 10 um, ventromedian supplements 4 - 5, odontostyle 9 um, odontophore 11 um, oesophagus 334 - 451 um, expanded part of oesophagus 147 - 250 um, cardia 7 5-10 um, nerve ring 107 - 121 um, prerectum 184 - 221 um, rectum 38 - 46 um, tail 18 - 19 um, ABD 19 - 22 um

Habitat and locality : Soil around roots of litchi plants (***Litchi chinensis***) from Litchi-Kesinvurthy Estate, Chikmagalur Distt

Remarks : The present specimens conform well with the description of ***A. (A.) elegans*** Jairajpuri, 1964 except in having slightly longer oesophagus and prerectum (oesophagus 500 um, prerectum 17 um in females and 181 - 201 um in males in the type specimens) Further, detailed study of the testes sheath showed that the muscular sheath is without oblique bands and measures about 1 5 um

AXONCHIUM (AXONCHIUM) SHAMIMI BAQRI AND KHERA, 1976

Measurements :

Females (n = 3) :L = 1 3 - 1 4 mm, a = 30 - 35, b = 2 - 2 3, c = 53 - 63, c' = 0 8, V = 56 - 62, G1 = 0 8 - 1 3, G2 = 12 - 13, odontostyle 9 um, odontophore 13 um, oesophagus 597 - 656 um, expanded part of oesophagus 385 - 404 um, cardia 16 - 19, nerve ring 125 - 132 um, prerectum 101 - 110 um, rectum 32 um, tail 22 - 26 5 um, ABD 29 - 33 um

Male (n = 1) : L = 1 3 mm, a = 37, b = 3, c = 60 3, c' = 0 8, T = 51, spicules 38 um, lateral guiding pieces 13 um, ventromedian supplements 4, odontostyle 7 5 um, odontophore 10 um, oesophagus 451 um, expanded part of oesophagus 276 um, cardia 12 5 um, nerve ring 112 um, prerectum 137 um, rectum 40 um, tail 22 um, ABD 28 um

Habitat and locality : Soil around roots of grasses (unidentified) from Navodhaya premises, Shigode, Chikmagalur Distt

Remarks : The present specimens conform well with ***A. (A.) shamimi*** Baqri and Khera, 1976 except in having longer odontophore , rudimentary anterior uterine sac, shorter prerectum and lesser number of ventromedian supplements (odontophore 10 - 11 um, G1 = 8 - 11, prerectum 151 - 212 um, ventromedian supplements 6 - 7 in ***A. (A.) shamimi***) Further, study on the muscular sheath enclosing the testes showed that the sheath is very thin, only about 1 um thick and the oblique bands are not observed

AXONCHIUM (AXONCHIUM) COOVERKOLLI N.SP.

(Fig 16)

Measurements :

Holotype female : L = 1 1 mm, a = 36 9, b = 2 6, c = 59 5, c' = 0 9, V = 52 5, G1 = 8 4, G2 = 17 2, odontostyle 9 um, odontophore 10 um, oesophagus 435 um, expanded part of oesophagus 257 um, prerectum 159 um, tail 19 um, ABD 21 um

Paratype females (n = 2) L = 1 1 - 1 3 mm, a = 36 - 47, b = 2 6, c = 60 - 71, c' = 0 8, V = 51 - 58 5, G1 = 9 4 - 10 9, G2 = 20 - 21, odontostyle 9 um, odontophore 10 um, oesophagus 401 - 472 um, expanded part of oesophagus 228 - 298 um, prerectum 140 - 174 um, rectum 21 - 25 um, tail 18 um, ABD 21 -22 um

Paratype male (n = 1) : L = 1 2 mm, a = 44, b = 3 3, c = 76 4, c' = 0 8, T = 58, spicule 30 um, lateral guiding pieces 9 um, odontostyle 9 um, odontophore 10 um, oesophagus 373 um, expanded part of oesophagus 194 um, prerectum 162 um, rectum 29 um, tail 16 um, ABD 21 um

Description :

Female : Body small, slightly ventrally arcuate upon fixation, cuticle finely transversely striated Lip region set off by constriction, about 7 5 um wide, 3 um high The outer and inner portions of the lips are demarkated by shallow depressions on the contour Amphids almost as wide as lip base, sensillar pouches situated posterior to odontophore base Odontostyle strongly sclerotized, fusiform with distinct lumen and wide aperture Odontophore simple, rod-like about 10 um long Guiding ring single, situated at 7 - 8 um from

anterior end Anterior part of oesophagus moderately muscular Posterior expanded part set off from the anterior part by constriction Basal expanded portion about 57 - 63% of total oesophageal length, enclosed in a straight band of muscular sheath Cardia tongue-shaped, about 10 - 15 um long Nerve ring situated at 100 um from anterior end DO 43-48, DN 44-49, DN-DN 1 2-1 3 SVN indistinct due to the thick muscular sheath

Reproductive system mono-opisthodelphic Vulva transverse, slit-like, inclined posteriad,not sclerotized Vaginal wall adjacent to vulva not differentiated from body cuticle, but gradually widening inwardly Anterior uterine sac moderately long about 96 - 118 um, filled with spindle-shaped sperms Posterior branch with typical structures Sptincter present at oviduct-uterus junction Prerectum about 6 - 8 5 anal body widths long Rectum more than one anal body width long Tail broadly rounded, distinctly clavate due to expansion of cuticle, less than one anal body width long with 3 caudal papillae on both the sides

Male : Similar to females in general morphology, tail more curved Testes paired, opposed, enclosed in a muscle shealth of about 2 5 um thick Oblique bands of musculature not observed Spicule simple, dorylaimoid with broad distal end, about 1 4 anal body widths long Lateral guiding pieces with blunt tip, about 9 um long Ventromedian supplements 6 and an adanal pair, arranged in two groups, widely spaced Tail with broadly rounded terminus, cuticle expanded to form clavate structure, caudal pores 3 on each side

Type locality and habitat : Soil around roots of coffee (***Coffea arabica***) plants from Cooverkolly Estate

Type material : Collected in March 1993 Holotype female on slide ***Axonchium (Axonchium) cooverkolli*** n sp /1 and paratype females and male on slides ***Axonchium (Axonchium) cooverkolli*** n sp /2-4

Relationship : ***Axonchium (Axonchium) cooverkolli*** n sp closely resembles *A. (A.) elegans* Jairajpuri, 1964 and *A. (A.) nitidum* Jairajpuri, 1964 From *A.(A.) elegans*, it differs in having lesser a value, shorter oesophagus and basal expansion, prerectum, lateral guiding pieces, in the shape of spicules and more ventromedian supplements (a = 50, oesophagus 500 um, basal expansion 312 um, prerectum 181 - 120 um in males, lateral guiding pieces 11 - 12 um, spicules 32 - 33 um and with usually wide and blunt distal end, ventromedian supplements 4 - 5 in *A.(A.) elegans*) From *A. (A.) nitidum*, it distinctly differs in having lesser 'a' value, shorter oesophagus, basal expansion, prerectum, tail and longer anterior uterine branch (a = 41 - 53 5, oesophagus 503 - 548 um, basal expansion 306 - 342 um, prerectum 188 - 206 um, tail 21 - 25 um in *A. (A.) nitidum*)

AXONCHIUM (AXONCHIUM) HOSAKODII N.SP.

(Fig 18)

Measurments :

Holotype female : L = 1 7 mm, a = 48 7, b = 3 4, c = 74 7, c' = 1 0, V = 48, G1 = 4 5, G2 = 14 0, odontostyle 9 um, odontophore 12 um, oesophagus 479 um, expanded part of oesophagus 241 um, prerectum 301 um, rectum 32 um, tail 25 um, ABD 24 um

Paratype female (n = 1) : L = 1 6 mm, a = 46 1, b = 3 4, c = 73 7, c' = 0 9, V = 46, G1 = 5 4, G2 = 15, odontostyle 9 um, odontophore 12 um,

oesophagus 482 um; expanded part of oesophagus 262 um; prerectum 235 um; rectum 30 um; tail 22 um; ABD 24 um.

Paratype male (n = 1) : L = 1.6 mm; a = 54; b = 4.7; c = 70.3; c' = 1.0; T = 63; spicule 26 um; lateral guiding pieces 7 um; ventromedian supplements 5; odontostyle 9 um; odontophore 12 um oesophagus 329 um; expanded part of oesophagus 122 um; prerectum 235 um; rectum 30 um; tail 22 um; ABD 22 um.

Description :

Female : Body slightly ventrally arcuate upon fixation. Cuticle finely transversely striated. Lip region set off by constriction, about 9 um wide, 4 um high. Lips more or less conoid and divided into outer and inner portions by a median depression. Amphids almost as wide as lip base, sensilla situated at the base of odontophore. Odontostyle strongly sclerotized, fusiform, lumen and aperture wide. Odontophore simple, rod-like, about 1.4 odontostyle lengths long. Guiding ring single, located at one lip width distance from anterior end. Anterior part of oesophagus muscular, set off from the basal expanded part by constriction. Basal expansion 50 - 54% of total oesophageal length, enclosed in straight band of muscular sheath. Cardia short, tongue-shaped, about one-half body width long. Nerve ring at 115 - 122 um from anterior end. DN almost at the same level as DO; SVN indistinct due to thick muscular sheath.

Reproductive system mono-opisthodelphic. Vulva transverse, thick-walled, opening wide. Vagina inclined posteriad, less than one-half corresponding body width deep. Anterior uterine branch moderately long 74 - 88 um, filled with spindle-shaped sperms. Posterior branch with usual

structures. Sphincter present at oviduct-uterus junction. Prectum about 10 -13 anal body widths long. Rectum more than one anal body widths long Tail bluntly rounded, slightly clavate due to expansion of cuticle, about one anal body widths long with 3 caudal pores on each side.

Male : Similar to females in general morphology except in having more arcuate tail portion Testes opposed, outstretched. Conspicuous muscle sheath of about 3.5 um thickness enclosed the testes and vasdeferens. Obligue muscular bands presents. Spicule weakly sclerotized, arcuate with blunt distal end Lateral guiding pieces with sclerotized bifed end. Ventromedian supplements 5, irregularly spaced and an adanal pair. Prerectum about 11 anal body widths long and extends beyond spicular range. Tail broadly rounded, about one anal body width long. Caudal pores 3 on each side.

Type locality and habitat : Soil around roots of coffee (***Coffea arabica***) from Hosakode Estate, Kadavanthi.

Type material : Collected in July 1993. Holotype female on slide ***Axonchium (Axonchium) hosakodii*** n.sp./1 and paratype female and male on slides ***Axonchium (Axonchium) hosakodii*** n.sp./2-3.

Relationship : ***Axonchium (Axonchium) hosakodii*** n.sp. comes close to ***A (A.) saccatum*** Jairajpuri 1964 and ***A (A.) nitidum*** Jairajpuri, 1964. From ***A (A.) saccatum,*** it differs in having more a, b values, lesser c value, shorter oesophagus, anteriorly located vulva, shorter odontostyle, basal expanded part of oesopagus, smaller spicules, lesser number of ventromedian supplements and shorter prerectum (a = 33 - 34; b = 3.1; c = 94 - 95; V = 51 - 52; oesophagus 644 - 675 um; basal expansion 404 - 432 um; odontostyle 10 - 11 um;

spicule 45 um, ventromedian supplements 6-9 and prerectum 355-370 um in *A (A.) saccatum*) Further, it differs from *A (A.) nitidum* mainly in having shorter oesophagus, basal expansion, longer anterior uterine branch and prerectum (oesophagus 503 - 548 um, expanded part of oesophagus 306 - 342 um, b = 2 5 - 3 0, G1 = 0 9 - 1 3, prerectum 188 - 206 um in *A (A.) nitidum*)

AXONCHIUM (AXONCHIUM) CAMELLIAE N.SP.

(Fig 18)

Measurements :

Holotype female : L = 2 0 mm, a = 38, b = 2 2, c = 74, c' = 0 7, V = 52 5, G1 = 0 9, G2 = 13, odontostyle 13 um, odontophore 13 um, oesophagus 894 um, expanded part of oesophagus 691 um, prerectum 213 um, rectum 40 um, tail 27 um, ABD 38 um

Paratype females (n = 3) : L = 1 8 - 1 9 mm, a = 34 - 38, b = 2 2 - 2 3, c = 71 - 76, c' = 0 6 - 0 7, V = 52 - 56, G1 = 0 6 - 1 2, G2 = 11 - 18, odontstyle 13 um, odontophore 13 - 15 um, oesophagus 797 - 873 um, expanded part of oesophagus 585 - 680 um, prerectum 188 - 243 um, rectum 32 - 40 um, tail 25 - 27 um, ABD 37 - 39 um

Description :

Female : Body slightly ventrally arcuate upon fixation Cuticle finely, transversely striated Lip region set off by constriction, about 9 - 10 um wide, 2 um high Lips with partly amalgamated inner parts Rounded inner and outer portions demarcated by a depression of the contour Amphids almost as wide as base of the lip region, sensilla situated at odontostyle

base Odontostyle strongly sclerotized, fusiform, aperture and lumen wide Guiding ring single, located at 7 5-9 um from anterior end Odontophore simple, rod-like slightly longer than odontostyle Oesophagus abnormally long, about 45% of total body length Basal expanded part of the oesophagus about 74 - 80% of total oesophageal length Anterior part of oesophagus set off from the basal part by deep constriction Basal expanded part enclosed in a muscle sheath of straight bands Intestine overlaps at the base of oesophagus Cardia long, tongue-shaped, about 19-27 um Nerve ring at 122-132 um from anterior end DN little below DO

Reproductive system mono-opisthodelphic Vulva transverse, opening wide Vagina thick walled, not differntiated from the body cuticle, inclined posteriad, slightly more than one-half corresponding body width deep, sphincter muscle band observed on the mid portion of the vagina Anterior uterine branch rudimentary Posterior ovary with usual structures Well developed sphincter present at oviduct-uterus junction Prerectum about 5-7 anal body widths long Rectum almost one anal body width long Tail short, hemispheroid, cuticle thick, radially striated Caudal papilla below anus feeble Caudal pores 3 or each side

Male : Not found

Type locality and habitat : Soil around roots of tea plants(***Camellia sinensis***) from Jaipura, Karnataka state

Type material : Collected in April 1993 Holotype female on slide ***Axonchium (Axonchium) camelliae*** n sp /1 and paratype females on slides ***Axonchium (Axonchium) camelliae*** n sp /2-4

Relationship : ***Axonchium (Axonchium) camelliae*** n.sp is distinctly different from other species in having very long oesophagus and basal expanded portion. It closely remembles ***A (A.) siddiqi*** Coomans and Nair, 1975 and ***A (A.) bulbosum*** Williams, 1958. From ***A (A.) siddiqi,*** it differs in having longer body, oesophagus, odontostyle, odontophore, tail, prerectum, shorter anterior uterine branch and in the absence of males (L = 1.12 - 1.45 mm; oesophagus 444 - 500 um; expanded part of oesophagus 234 - 287 um; G1 = 5 - 6.5; odontostyle 8 - 9 um; odontophore 9.5 - 10.5 um; prerectum 110 - 203 um; tail 21 - 23 um and males present in ***A (A.) siddiqi***. From ***A (A.) bulbosum***, it differs in having longer body, oesophagus and odontostyle (L = 1.29 - 1.4 mm; oesophagus 460 - 580 um; expanded part of oesophagus 268 - 380 um; tail 17 - 18 um; G1 = 1.7 - 2.3; odontostyle 9.5 - 10 um; odontophore 10 - 12 um in ***A (A.) bulbosum***).

SUBGENUS *UNIQAXONCHIUM* N.SUBGEN.

In the present course of study a species of belondirid nematode was found in the soil samples collected from the Malnad tracts of Karnataka state, which shares characters of ***Axonchium (Axonchium)*** Cobb, 1920 and ***Axonchium (Phallaxonchium)*** Jairajpuri and Dhanachand, 1978 n. rank. It is unique in having posteriorly inclined, long and slender vagina with distinct sphincter muscles on the walls and differently shaped, long and bulky spicules with a hyaline structure in its middle. The name ***Uniqaxonchium megaspiculum*** n.subgen., n.sp. is proposed for its reception. The new subgenus is placed in the subfamily Belondiridae because of the presence of muscular sheath around the expanded part of oesophagus, fusiform odontostyle , rounded tail and mono-opisthodelphic gonad.

Diagnosis : Body moderate-sized, slightly ventrally arcuate upon fixation. Lip region set off. Odontostyle fusiform. Odontophore simple, rod-like. Guiding ring single. Anterior part of oesophagus moderately muscular; posterior expanded portion enclosed in a muscular sheath of straight bundles. Anterior and posterior part of oesophagus separated by deep constriction, abutting each other. Cardia short, bluntly conoid to rounded. Vulva transverse, vagina highly inclined posteriorly, long and slender with prominent sphincter muscles on the walls. Reproductive system mono-opisthodelphic. Anterior uterine branch moderately long. Posterior branch well developed, uterus convoluted. Sphincter present at oviduct-uterus junction. Spicules long, moderately bulky with distinct median canal and well developed lateral guiding pieces with distally sclerotized bifed tip. Ventromedian supplements 4 - 6, widely spaced in irregular arrangement. Tails

short, hemispheroid, about one anal body width long, slightly clavate due to thickening of cuticle, similar in sexes Caudal papilla present below anus in a depression Caudal pores 2 or 3 on each side

Relationship : ***Uniqaxonchium*** n subgen closely resembles the subgenus ***Axonchium (Axonchium)*** Cobb, 1920 and ***Axonchium (Phallaxonchium)*** Jairajpuri and Dhanachand, 1978 in general morphology and structure From both the subgenera, it differs in having highly inclined, long, slender vagina with distinct sphincter musculature on the walls and uniquely shaped, long spicules with a hyaline like structure in the middle portion

Type and only species :

Uniqaxonchium megaspiculum n sp

UNIQAXONCHIUM MEGASPICULUM N.SP.

(Fig 19)

Measurements :

Holotype female : L = 1 4 mm, a = 50 6, b = 2 6, c = 67 3, c' = 1 0, V = 56, G1 = 6, G2 = 15 7, odontostyle 7 5 um, odontophore 10 um, oesophagus 540 um, expanded part of oesophagus 323 um, prerectum 243 um, rectum 28 um, tail 21 um, ABD 21 um

Paratype females (n=4) : L= 1 4-1 8 (1 6 ± 0 2) mm, a = 50 6 - 63 1 (57 ± 6 7), b=2 6 - 3 4 (3 ± 0 4), c= 71 2 - 91 2 (80 ± 8 3), c'= 1 0, V = 46 5 - 56, G1 = 5 3 - 6 4, G2 = 13 6 - 15 8, odontostyle 7 5 - 8 um, odontophore 10 um, oesophagus 504 - 576 (540 ±29 4) um, expanded part of oesophagus 287 - 375 (325 ± 37) um, prerectum 213 - 287 (252 ± 31 6) um, rectum 25 - 30 um, tail 19-21 um, ABD 21 um

Paratype males (n=4): L=0 9 - 1 8 (1 4 ± 0 4) mm, a = 35 3 - 66 8 (53 8 ± 13 2), b = 2 2 - 4 2 (3 3 ± 0 8), c = 48 9 - 89 0 (74 8 ± 18), c' = 0 9 - 1 0, T = 53-87 (63 ± 16), spicules 52 - 55 (54 ± 0 8) um, lateral guiding pieces 10-12 um, ventromedian supplements 4-6, odontostyle 7 5 - 8 um, odontophore 10 um, oesophagus 348 - 487 (432 ± 63 6) um, expanded part of oesophagus 153 - 301 (226 ± 61) um, prerectum 257 - 323 (296 ± 28) um, rectum 38-60 (47 5 ± 9 5) um, tail 18 - 20 um, ABD 20-21 um

Description :

Female : Body moderate, slender, ventrally arcuate upon fixation, more strongly at the posterior region Cuticle finely, transversely striated, about 2 um at midbody, 5-7 5 um at tail Lip region distinctly set off by constriction, 7 5 - 8 um wide, 3 um high, lips conical, partially separated Amphids almost as wide as lip base, sensilla situated posterior to base of odontophore Odontostyle fusiform, strongly sclerotized, about one lip width long, aperture and lumen wide Guiding ring single, located at 6 um from anterior end Odontophore simple, rod-like, about 1 3 odontostyle length long Oesphagus 504 - 574 um long Anterior part moderately muscular, abutting by constriction from the posterior part Basal expanded part about 57-65% of total oesophageal length, enclosed in a sheath of straight muscle bands Cardia short, bluntly conoid to rounded, about 10-13 um long Overlapping of intestine observed on the base of oesophagus Nerve ring located at 113-125 um from anterior end Oesophageal gland nuclei and their orifices are located as follows

DO	41-43	S_1N_1	57-59
DN	43-45	S_1N_2	58-60
DO-DN	0 6-0 8	S_2O	87-89

Reproductive system mono-opisthodelphic Vulva transverse, not sclerotized, vagina more than the corresponding body width deep, highly inclined posteriad Well developed sphincter muscular bands on the vaginal walls observed Vaginal lumen narrow Anterior uterine branch a long sac filled with spindle-shaped sperms Posterior branch well developed, uterus convoluted Distinct sphincter present at oviduct - uterus junction Prerectum about 10 4-14 anal body widths long Rectum about 1 3 - 1 4 anal body widths long Tail broadly rounded, short, about one anal body width long Slight depression present at the point where caudal papilla situated below the anus Clavate due to expansion of tail cuticle Caudal pores two on each side

Male : Similar to females, slighly shorter, 0 9 - 1 8 mm long Testes paired, out stretched, thick muscular sheath on the gonads absent Sperms spindle-shaped, 4-5 um long Spicules long, moderately bulky, tip blunt, about 2 7 anal body widths long with a clear median canal Hyaline structure present at the middle portion of the spicule Lateral guiding pieces well developed, about one-fifth spicular length long, distinctly sclerotized at the bifed tip Supplements an adanal pair and 4 - 6 irregularly spaced ventromedians, appears to be in two groups, 2 - 3 widely spaced, 2 - 3 closely arranged Coupulatory muscles few Prerectum about 12 5 -16 anal body widths long, ends well above ventromedian supplements Rectum 38 - 60 um Tail short, broadly rounded, about one anal body width long with a caudal papilla and two caudal pores on each side

Type habitat and locality : Soil around roots of grasses (unidentified) near Shigode

Type material : Collected in August, 1994 Holotype female on slide ***Uniqaxonchium megaspiculum*** n subgen , n sp /1 and paratype females and males on slides ***Uniqaxonchium megaspiculum*** n subgen , n sp /2-4

SUBFAMILY DORYLAIMELLINAE JAIRAJPURI, 1964

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region narrow, truncated, set off from body contour. Oral aperture surrounded with cuticularised pieces. Odontostyle small. Odontophore bipartite, basal part with distinct flanges. Vulva transverse or longitudinal. Female reproductive system monodelphic or amphidelphic. Males with spicules usually proximally broad with an abrupt ventral angle; arcuate; lateral guiding pieces present. Tails variable in size and structure, short, bluntly rounded to long, filiform; similar in sexes.

Type and only genus :

Dorylaimellus Cobb, 1913

GENUS *DORYLAIMELLUS* COBB, 1913

The genus ***Dorylaimellus*** was proposed by Cobb (1913). It was split into 8 subgenera by Jairajpuri and Ahmad (1980). They (l.c.) further demoted six genera proposed by Siddiqi (1983) as subgenera under ***Dorylaimellus*** in the year 1992. The subgenera of ***Dorylaimellus*** are highly varied. The differentiations are simple but unique and distinct and hence in the present study, Jairajpuri and Ahmad's (1992) views on dividing the genus into different subgenera are accepted and followed. In the present course of study, soil samples collected from different localities of Malnad tracts yielded a new subgenus which is described and illustrated.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body small to medium-sized, ventrally arcuate upon fixation. Cuticle finely, transversely

striated. Lateral chords with glandular organs. Lip region narrow, truncated, usually set off by constriction; labial papillae raised; labial disc present or absent. Refractive cuticularised pieces around stoma, four. Amphids wide, apertures slit-like. Odontostyle small. Guiding ring single. Odontophore bipartite, basal part with distinct flanges. Basal expanded part of oesophagus enclosed in thick sheath of spiral muscles. Cardia conoid or hemispheroid. Female reproductive system monodelphic or amphidelphic. Vulva transverse or longitudinal. Spicules generally massive, proximally broad, with abrupt ventral angles, often arcuate. Ventromedian supplements usually arranged in pairs, often spaced Lateral guiding pieces present. Tails variable in shape; similar in sexes.

Type subgenus :

Dorylaimellus Cobb, 1913

Other subgenera :

Axodorylaimellus Jairajpuri and Ahmad, 1980

Belondorylaimellus Jairajpuri and Ahmad, 1980

Clavidorylaimellus Jairajpuri and Ahmad, 1980

Elongidorylaimellus Jairajpuri and Ahmad, 1980

Filidorylaimellus Jairajpuri and Ahmad, 1980

Mesododorylaimellus Jairajpuri and Ahmad, 1980

Metadorylaimellus Jairajpuri and Ahmad, 1980

Amazonema (Siddiqi, 1983) Jairajpuri and Ahmad, 1992

Capitellus (Siddiqi, 1983) Jairajpuri and Ahmad, 1992

Ibadanus (Siddiqi, 1983) Jairajpuri and Ahmad, 1992

Jamilius (Siddiqi, 1983) Jairajpuri and Ahmad, 1992

Rashidanema (Siddiqi, 1983) Jairajpuri and Ahmad, 1992

Sindellus (Siddiqi, 1983) Jairajpuri and Ahmad, 1992

Nygellolaimellus N.subgen.

SUBGENUS *NYGELLOLAIMELLUS* N.SUBGEN.

Soil samples collected from different localities of Malnad tracts yielded quite a number of specimens which share the characters of ***Axodorylaimellus*** Jairajpuri and Ahmad, 1980, ***Mesododorylaimellus*** Jairajpuri and Ahmad, 1980 and ***Rashidanema*** (Siddiqi, 1983), Jairajpuri and Ahmad, 1992. The name ***Nygellolaimellus muthi*** n subgen , n sp is proposed for its reception.

Diagnosis : Body small and almost straight upon fixation Cuticle thin, finely transversely striated. Lateral chords with glandular organs Lip set off by constriction, high, angular, amalgamated; peri-oral disc absent Refractive cuticularised pieces present around entrance to stoma Odontostyle small, ventral arm angular in middle, lumen and aperture narrow. Guiding ring single. Odontophore bipartite, flanges well developed, longer than odontostyle . Anterior part of oesophagus very narrow behind spear extension, then widening slightly and becoming cylindrical up to nerve ring, narrowing again as it passes through the nerve ring. Posterior basal expanded part fusiform, about one-third total oesophageal length. Cardia short, hemispheroid Intestine appears to be attached to the middle of cardia Vulva transverse, opening wide, structure similar to ***Belondira***. Reproductive system amphidelphic Prerectum long, rectum slightly more than one anal body widths long, anus

a transverse slit. Tail short, cylindroid, slightly clavate about 2.5 - 3 anal body widths long.

Type and only species :

Nygellolaimellus muthi n.sp.

Relationship : The new subgenus ***Nygellolaimellus*** is distinctive in the absence of peri-oral disc, in having cuticularised pieces around stoma, in vulval structure and tail shape. It resembles ***Axodorylaimellus*** Jairajpuri and Ahmad, 1980; ***Mesodorylaimellus*** Jairajpuri and Ahmad, 1980 and ***Rashidanema*** (Siddiqi 1983) Jairajpuri and Ahmad, 1992 From ***Axodorylaimellus***, it differs in the absence of peri-oral disc and peri-oral sclerotization, shorter oesophagus, and in the shape of tail (peri-oral disc and sclerotization distinct; oesophagus long and tail subcylindrical, hemispherical or subclavate with abnormally thickened cuticle at tip in ***Axodorylaimellus***).Further, it can be differentiated from ***Mesodorylaimellus*** in having amphidelphic gonads, cuticularized pieces around stoma, shorter expanded part of oesophagus and tail shape (gonads monodelphic - prodelphic; cuticularized pieces around stoma indistinct or absent; expanded part of oesophagus long and tail short, cylindrical, subcylindrical or conoid-rounded in ***Mesodorylaimellus***). It can be differentiated from ***Rashidanema*** in having shorter expanded part of oesophagus, cuticularized pieces around stoma and tail shape (expanded part of oesophagus about 48-51%; cuticularized pieces around stoma absent; tail elongate, attenuated, finely rounded in ***Rashidanema***).

NYGELLOLAIMELLUS MUTHI N.SP.

(Fig 15)

Measurements :

Holotype female : L = 0 8 mm, a = 36 6, b = 5, c = 27, c' = 2 8, V = 46, G1 = 10 2, G2 = 12 1, odontostyle 4 um, odontophore 11 um, oesophagus 151 um, expanded part of oesophagus 60 um, prerectum 82 um, rectum 18 um, tail 28 um, ABD 10 um

Paratype females (n = 6) : L = 0 7 - 0 8 mm, a = 36 6 - 40 4 (38 2 ± 1 5), b = 4 9 - 5 1, c = 26 3 - 34 2 (29 2 ± 3 4), c' = 2 5 - 31 (2 9 ± 0 3), V = 42 - 47 (45 ± 2), G1 = 9 5 - 13, G2 = 9 - 14 4, odontostyle 4 um, odontophore 10 - 11 um, oesophagus 151 - 159 (153 6 ± 3 5) um, expanded part of oesophagus 53 - 65 (59 5 ± 5) um, prerectum 82 - 88 (88 ± 3) um, rectum 18 - 23 5 (20 ± 2 6) um, tail 22 - 29 (26 5 ± 3 2) um, ABD 9 - 10 um

Description :

Female : Body almost straight to very slightly ventrally arcuate upon fixation, less than 1mm long, tapering towards extremities Cuticle finely transversely striated, less than 1 um at midbody, slightly more than 1 um at tail Lateral chords about one-third to one-half body width wide at midbody, glandular Lip region set off by constriction 6 - 7 um wide, 3 um high, truncated, amalgamated Peri-oral disc and sclerotization absent Retractive cuticularised pieces present around stoma Amphids 4 - 6 um wide, stirrup-shaped Odontostyle small, weakly sclerotized, about one-half lip width long, ventral arm bent at middle, lumen and aperture narrow Guiding ring single, located at 4 5 - 6 um from anterior end

Odontophore bipartite, slightly less than 3 odontostyle lengths long, basal part with distinct flanges. Nerve ring conspicuous, located at 57 - 66 um from anterior end. Anterior part of oesophagus very narrow behind the base of odontophore, then widening slightly to become cylindrical just above nerve ring and again as it passes the nerve ring narrows to thin tubular structure. Posterior part of oesophagus about 35-41% of total oesophageal length, fusiform, expansion almost abrubt, continuous. Basal part of oesophagus enclosed in a thick sheath of sinistrally spiral muscular sheath. Cardia short, hemispheroid, less than one-half corresponding body width long. Intestine appears to be attached at the middle portion of cardia. Oesophageal gland nuclei and their orifices are located as follows:

DO	70-77	S_1N_1	85-86
DN	70-78	S_1N_2	85-86
DO - DN	1-1.2	S_2O	94-96

Female reproductive system amphidelphic. Vulva transverse, opening wide, similar to the genus ***Belondira***, almost spherical, less than one-half corresponding body width deep. Uterus short, lacks sperms. Poorly developed sphincter present at oviduct-uterus junction. Gonads long, sometimes reflexed beyond vulva, often with one or two eggs, oocytes arranged in a single line except at tip. Eggs cylindroid, slender 78 - 81 um long, 15 - 16 um wide. Prerectum 8 - 9 anal widths long. Rectum about 2 anal body widths long. Tail 2.5 - 3.1 anal body widths long. Cylindroid, slightly clavate, tip appears wider than anal body diameter with obscure caudal pore.

Male : Not found.

Type habitat and locality : Soil around roots of grasses (unidentified) and paddy (***Oryza sativa***) from Muthinakoppa.

Type material : Collected in July 1993. Holotype female on slide ***Nygellolaimellus muthi*** n.subgen., n.sp./1 and paratype females on slides ***Nygellolaimellus muthi*** n.subgen., n.sp./2-4.

SUBFAMILY SWANGERIINAE JAIRAJPURI, 1964

Diagnosis : (Emended). Lip region narrow, rounded. Odontostyle small, odontophore simple, rod-like. Oesophagus usually short, basal expanded portion often fusiform. Vulva transverse. Female reproductive system monodelphic or amphidelphic. Male reproductive organs dorylaimoid, spicules arcuate, lateral guiding pieces present. Ventromedian supplements few to numerous, usually contiguous, rarely widely spaced. Tails long filiform to whip-like; similar or dissimilar in sexes.

Type genus :

Swangeria Thorne, 1939

Other genera :

Oxydirus Thorne, 1939

Falcihasta Clark, 1964

Roques Thorne, 1964

Qudsiella Jairajpuri, 1967

Lindseyus Ferris and Ferris, 1973

Oxybelondira Ahmad and Jairajpuri, 1979

Paraoxydirus Jairajpuri and Ahmad, 1979

Paraqudsiella Siddiqi, 1981

Paraoxybelondira N.Gen.

Duriella N.Gen.

GENUS *PARAOXYDIRUS* JAIRAJPURI AND AHMAD, 1979

Jairajpuri and Ahmad (1979) proposed the genus ***Paraoxydirus*** for the specimens characterized with symmetrical lip region and odontostyle, expanded part of oesophagus enclosed in thick sheath of sinistrally spiral muscle, long filiform tails in both the sexes. ***Oxydirus magnus*** Timm, 1964 was synonymised and proposed as its type species. ***Tarjanius*** Ferris, Goseco and Ferris, 1980 was synonymised with ***Paraoxydirus*** by Ferris, Goseco and Ferris in the consequent year along with two new species

Soil samples collected from different localities of Malnad tracts yielded three known and a new species of ***Paraoxydirus*** that are described and illustrated. ***P. cavenessi*** (Ferris, Goseco and Ferris, 1980) Ferris, Goseco and Ferris, 1981 is reported for the first time from India. In the present study, all the species collected were mainly from paddy fields which may be an indication that this genus is largely aquatic in nature

Diagnosis:(Emended).Body usually very long, straight to slightly ventrally arcuate upon fixation. Cuticle finely, transversely striated Lip region symmetrical or asymmetrical, continuous with body contour. Amphids wide, stirrup or cup-shaped, apertures slit-like. Odontostyle small, asymmetrical, moderate to strongly sclerotized, less than one lip width long, lumen and aperture narrow. Guiding ring single. Odontophore simple, rod-like, weakly sclerotized, usually longer than the odontostyle Oesophagus short; expanded part fusiform, occupying about one-third to two-fifths total oesophageal length, enclosed in thick sheath of sinistally spiral muscles. Cardia large, hemispheroid to elongate or tongue-shaped

Female reproductive system amphidelphic Vulva transverse, opening usually wide, vagina large with thick muscular traingular structures around opening Males with well developed, arcuate spicules, lateral guiding pieces and 9 - 15 closely arranged ventromedian supplements beginning well above spicular range Prerectum long, 7 - 19 anal body widths long Tails long, filiform to whip-like, similar in sexes

Type species :

Paraoxydirus magnus (Timm, 1964), Jairajpuri and Ahmad, 1979

Other species :

P. cavenessi (Ferris, Goseco and Ferris, 1980) Ferris, Goseco and Ferris, 1981

P. gigas (Jairajpuri, 1964) Jairajpuri and Ahmad, 1979

P. novus (Jairajpuri, 1965) Jairajpuri and Ahmad, 1979

P. pelinus (Ferris, Goseco and Ferris, 1980) Ferris, Goseco and Ferris, 1981

P. abnormus n sp

PARAOXYDIRUS NOVUS (JAIRAJPURI, 1965) JAIRAJPURI AND AHMAD, 1979

Measurements :

Females (n = 8) : L = 3 - 3 9 (3 5 ± 0 3) mm, a = 64 3 - 81 9 (74 8 ± 5 9), b = 10 0 - 11 9 (11 1 ± 0 7), c = 4 9 - 6 (5 4 ± 0 4), c' = 18 3 - 24 5 (21 4 ± 2 2), V = 31 - 35 (33 ± 2 0), G1 = 8 8 - 11 1, G2 = 10 - 12, odontostyle 7 - 7 5 um, odontophore 16 - 18 um, guiding ring 7 5 - 8 um, oesophagus 301-343 (316 5 ± 17) um, basal expansion 109-137 (127± 10 6) um, cardia 21 - 23 um, nerve ring 132 - 154 un, prerectum 404 - 573 um, rectum 41 - 47 um, tail 537 - 773 (629 ± 70) um, ABD 30 - 32 um

Male : Not found

Habitat and locality : Soil around roots of grasses (unidentified) and paddy (*Oryza sativa*) from Muthinakoppa

Remarks : The present specimens conform well with the original description of *P. novus* (Jairajpuri, 1965) Jairajpuri and Ahmad, 1979 except in having greater a, longer odontophore and prerectum (a = 65-68, odontophore about two odontostyle lengths long, prerectum 385 um in the type material) Further, the asymmetry of the lip region described for *P. novus* as an artifact is observed to be a species specific character of this species All speciemens in this collection show asymmetrical lip region and odontostyle

PARAOXYDIRUS GIGAS (JAIRAJPURI, 1964) JAIRAJPURI AND AHMAD, 1979

Measurements :

Females (n = 8) : L = 3 3 - 4 4 (3 8 ± 0 4) mm, a = 69 7 - 87 3 (80 ± 8), b = 9 8 - 14 (12 4 ± 1 8), c = 7 - 9 (8 ± 0 7), c' = 13 - 16 3 (14 9 ± 1 4), V = 35 - 39 (37 6 ± 1 6), G1 = 11 4 - 20, G2 = 11 - 14, odontostyle 7 - 7 5 um, odontophore 13 - 15 um, guiding ring 4 - 6 um, oesophagus 295 - 346 (311 3 ± 18 3) um, basal expansion 96 - 122 (110 ± 9) um, nerve ring 126-149 um, cardia 15-21 um, prerectum 132-314 (220±80) um, rectum 28 - 48 um, tail 439 - 550 (484 ± 45) um, ABD 31 - 34 um

Males (n = 6) : L = 3 1 - 4 (3 4 ± 0 30) mm, a = 73 - 90 (78 3 ± 6 7), b = 10 - 12 9 (11 ± 1 1), c = 7 3 - 11 2 (8 3 ± 1 5), c' = 9 6 - 14 2 (12 7 ± 1 8), T = 59 - 70 (63 ± 5 5), spicule 47 - 54 (49 7 ± 2 7) um, lateral guiding pieces 9 - 13 um, ventromedian supplements 12 - 15, odontostyle

7 - 7 5 um, odontophore 10 - 13 um, oesophagus 307 - 319 (312 ± 5 3) um, basal expansion 103 - 118 (115 ± 6) um, guiding ring 4 - 6 um, nerve ring 132 - 143 um, cardia 17-24 um, prerectum 382 - 500 (429 ± 42) um, rectum 44 - 66 um, tail 353 - 415 (421 ± 50 6) um, ABD 31 - 37 (33 ± 2) um

Habitat and locality : Soil around the roots of grasses (unidentified) and paddy (***Oryza sativa***) from Muthinakoppa

Remarks : The present specimens conform well with the description of ***P. gigas*** Jairajpuri 1964 except in having slightly shorter odontostyle and prerectum (odontostyle 5 - 6 um, prerectum 10 anal body widths long in the type material vs 4 - 10)

PARAOXYDIRUS CAVENESSI (FERRIS, GOSECO AND FERRIS, 1980) FERRIS, GOSECO AND FERRIS, 1981

Measurements :

Female (n = 1) : L = 3 5 mm, a = 84 4, b = 11 9, c = 11 5, c' = 9 3, V = 40, G1 = 11, G2 = 10 6, odontostyle 8 um, odontophore 13 um, guiding ring 5 um, nerve ring 132 um, oesophagus 293 um, basal expansion 109 um, cardia 15 um, prerectum 265 um, rectum 38 um, tail 301 um, ABD 32 um

Male (n = 1) : L = 3 1 mm, a = 77 9, b = 11 3, c = 8 1, c' = 12 3, T = 53, spcicute 43 um, lateral guiding pieces 9 um, ventromedian supplements 9, odontostyle 7 5 um, odontophore 13 um, guiding ring 6 um, nerve ring 125 um, oesophagus 275 um, basal expansion 91 um, cardia 19 um, prerectum 221 um, rectum 47 um, tail 380 um, ABD 31 um

Habitat and locality : Soil around roots of paddy (***Oryza sativa***) from Balehonnur, Karnataka state

Remarks : The present specimens conform well with the original description of *P. cavenessi* (Ferris, Goseco and Ferris, 1980) Ferris, Goseco and Ferris, 1981 except in having shorter tail, odontostyle, odontophore and longer spicules (c = 5 6 - 9 8, c' = 13 - 21, odontostyle 5-7 um, odontophore 11 um, spicule 36 - 37 um in the type material) *P. cavenessi* is reported for the first time from India

PARAOXYDIRUS ABNORMUS N.SP.

(Fig 20)

Measurements :

Holotype female : L = 5 7 mm, a = 124, b = 16 8, c = 9 3, c' 19 8, V = 39, G1 = 12, G2 = 14, odontostyle 7 5 um, odontophore 10 um, oesophagus 342 um, basal expansion 118 um, prerectum 331 um, rectum 40 um, tail 615 um, ABD 31 um

Paratype females (n = 3) : L = 5 3 - 6 3 (5 8) mm, a = 102 - 124 (117), b = 12 8 - 18 2 (15 9), c = 8 - 10 6 (9 3), c' = 17 6 - 19 8 (19), V = 35 - 39 (37), G1 = 8 7 - 17, G2 = 12 - 16 5, odontostyle 7 5 um, odontophore 10 um, oesophagus 342 - 416 (368) um, basal expansion 118 - 146 (127) um, prerectum 279 - 331 (299) um, rectum 32 - 40 um, tail 596 - 668 (626) um, ABD 31 - 34 (33) um

Paratype males (n = 3) : L - 4 9 - 5 7 (5 4) mm, a = 111 - 130 (123), b = 13 5 - 15 8 (15), c = 12 1 - 15 6 (13 3), c' = 9 6 - 12 7 (11 1), T = 60-68 (64), spicule 48 - 53 (51) um, lateral guiding pieces 12 - 15 um, ventromedian supplements 12 - 15, odontostyle 7 5 um, odontophore 10 - 12 um, oesophagus 350-365 (358) um, basal expansion 113-129

(120) um, prerectum 566 - 681 (617) um; rectum 51 - 62 um, tail 354 - 465 (408) um, ABD 36 - 37 um

Description :

Female : Body very long, more than 6 mm, tapering towards extremities, almost straight upon fixation, cuticle finely transversely striated Lateral chords about one-fifth body width wide, glandular Lip region continuous, amalgamated, distinctly asymmetrical, truncated, dorsal side higher than the ventral side, about 12 um wide, 4 um high Labial papillae distinct Cephalic refractive structures present. Amphids stirrup-shaped, about three-fourths lip width wide, asymmetrical like the lip region, sensillar pouches situated at the base of odontophore. Odontostyle small, less than one lip width long, weakly sclerotized, ventral arm bent at tip, aperture and lumen narrow Guiding ring single, odontophore slightly longer than odontostyle, simple, rod-like Oesophagus short, anterior part a slender tubular structure, posterior expanded part fusiform, occupying about 34 - 35% of total oesophageal length Muscular sheath enclosing the basal expanded part of oesophagus with very thick oblique, sinistrally spiral, overlapped bands. Cardia spatulated, about 15 - 17 um long Nerve ring situated at 154 - 168 um from anterior end. DO - DN at some distance from each other SVN indistinct due to very thick muscular sheath

Reproductive system amphidelphic. Vulva pore-like, pre-equatorial, thick-walled Triangular cuticular pieces at vulva-vagina junction distinct Radial muscles around vulva prominent Vagina large, about three-fifths body width deep, cylindrical. Uterus a large sac-like structure filled with spindle-shaped sperms. Distinct sphincter present at

oviduct-uterus junction. Proximal part of oviduct large, glandular Oocytes arranged in a single row except at the tip. Prerectum about 8 - 11 anal body widths long. Rectum about one anal body width long Anus a wide, transverse slit. Tail very long, whip-like, about 18 - 20 anal body widths long Caudal papillae two on each side.

Male : Similar to females except in the ventrally arcuate tail portion and comparatively shorter tail. Testes paired, outstretched. Ventromedian supplements 12 - 15 serially arranged but irregularly spaced and an adanal pair. Spicules well developed, broad, arcuate, about 49 - 53 um long Lateral guiding pieces well developed about one-fourth to one-third of spicular length Prerectum longer than of females, about 15 - 19 anal body widths long, ends much above the range of ventromedian supplements. Rectum about 51 - 62 um long. Tail long, whip-like, about 15 - 17 anal body widths long. Caudal papillae three on each side.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) from Chikmagalur Distt.

Type material : Collected in August 1993. Paratype female on slide ***Paraoxydirus abnormus*** n.sp./1 and paratype females and males on slides ***Paraoxydirus abnormus*** n.sp./2-4.

Relationship : ***Paraoxydirus abnormus*** n.sp. distinctly differs from the other species in the presence of weakly sclerotized odontostyle, very thick, overlapping, sinistrally spiral muscular sheath on the basal expanded part of oesophagus and pore-like vulva. Sturucture of odontostyle and oesophageal muscular sheath resembles the genus ***Lindseyus*** Ferris and Ferris, 1973. It comes closer to ***Paraoxydirus pelinus*** Ferris, Goseco and Ferris, 1980 in its longer body and other

structures, but distinctly differs in having longer oesophagus, basal expansion, posteriorly located, pore-like vulva, wider and asymmetrical lip region, amphids, muscular bands on the basal expansion, longer prerectum and in having more ventromedian supplements (oesophagus 266-311 um; basal expansion 30%; muculature not very thick; V = 29-34; lip region 9 um wide, symmetrical; amphids symmetrical; prerectum about 9 anal body widths long; vulva transverse; ventromedian supplements 11-13 in ***P. pelinus***).

GENUS *PARAOXYBELONDIRA* N.GEN.

During the present course of study, soil samples collected from Coorg District yielded a new genus of the subfamily Swangeriinae which is described and illustrated. The name ***Paraoxybelondira mayili*** n.gen., n.sp. is proposed for its reception. The new genus is characterized in having a peri-oral disc, sinistral muscular sheath on the basal part of oesophagus and mono-opisthodelphic gonad.

Diagnosis : Body moderate-sized, almost straight upon fixation, tapering towards extremities. Lip region continuous, amalgamated with a non-sclerotized peri-oral disc. Cuticle thick, finely transversely striated. Lateral chords about one-fourth body width wide, glandular, lateral body pores distinct. Cephalic sclerotization absent, odontostyle small, asymmetrical like ***Paraoxydirus***. Odontophore simple, rod-like, longer than odontostyle. Guiding ring single. Amphids cup-shaped, duplex, apertures slit-like. Anterior part of oesophagus a slender, tubular structure. Basal expansion about 46 - 47%, moderately muscular, fusiform, enclosed in distinct sinistrally spiral muscle sheath. Cardia short, tongue-shaped with bluntly pointed tip. Intestine narrow at junction with oesophagus. Female reproductive system mono-opisthodelphic. Vulva pre-equatorial, transverse with wide opening.Prerectum moderately long. Anus a transverse slit. Tail cylindroid up to 25 - 30% of tail length, then gradually tapering to a long filiform structure with bluntly pointed tip. Caudal papillae 3 on each side. Males with dorylaimoid gonads, spicules long and slender, distal end bluntly pointed. Lateral guiding pieces present. Ventromedian supplements 3, widely spaced, and an adanal pair. Tail and caudal papillae similar to females.

Type and only species :

Paraoxybelondira mayili n.sp.

Relationship : ***Paraoxybelondira*** n.gen. is distinctive in having a peri-oral disc, narrower lip region, small, asymmetrical odontostyle, sinistrally spiral muscles on the basal expansion of oesophgus, mono-opisthodelphic gonad with anterior uterine sac, ***Belondira-*** type vagina, cylindroid and then long filiform tail, slender spicule and lesser ventromedian supplements.

It closely resembles ***Oxybelondira*** Ahmad and Jairajpuri, 1979; ***Oxydirus*** Thorne, 1939 and ***Paraoxydirus*** Jairajpuri and Ahmad, 1979 in the general body shape and long filiform tail. It distinctly differs from ***Oxybelondira*** in the presence of peri-oral disc, absence of cephalic sclerotization, asymmetrical odontostyle, amphid structure, sinistrally spiral muscular sheath on the basal expanded part of oesophagus (peri-oral disc absent; cephalic sclerotization distinct; odontostyle long and straight; amphids stirrup-shaped, not duplex; muscular sheath of basal part of oesophagus dextrally spiral in ***Oxybelondira***). From ***Oxydirus***, it differs in the presence of peri-oral disc, sinistrally spiral muscular sheath of the oesophagus, asymmetrical odontostyle, in tail shape and in having fewer ventromedian supplements in males (peri-oral disc absent; odontostyle symmetrical; muscular sheath of oesophagus dextrally spiral; tail long filiform; spicule arcuate and different in shape; ventromedian supplements more in ***Oxydirus***). Further, it distinctly differs from ***Paraoxydirus*** in having much smaller body, peri-oral disc, symmetrical lip-region, longer basal expansion, mono-opisthodelphic gonad, tail shape, in having lesser ventromedian supplements and slender, arcuate spicules (L = 3 - 6.3 mm;

peri-oral disc absent; lip region generally asymmetrical; basal expanded part of oesophagus two-fifths to one-third total oesophageal length; gonads amphidelphic; tail very long, filiform; ventromedian supplements numerous; spicules moderatly bulky in ***Paraoxydirus***).

PARAOXYBELONDIRA MAYILI N.SP.

(Fig. 21)

Measurements :

Holotype female : L = 1.7 mm; a = 53; b = 5.8; c = 7.8; c' = 9.7; V = 32; G1 = 3.3; G2 = 14.2; odontostyle 4 um; odontophore 13 um; oesophagus 293 um; basal expansion 140 um; prerectum 91 um; rectum 29 um; tail 221 um; ABD 23 um.

Paratype female (n = 1) : L = 1.5 mm; a = 46.6; b = 5.1; c = 6.5; c' = 9.8; V = 42; G1 = 4; G2 = 20; odontostyle 4 um; odontophore 13 um; prerectum 81 um; rectum 29 um; tail 231 um; ABD 23.5 um.

Paratype male (n = 1) : L = 1.7 mm; a = 51.8; b = 5.6; c = 7.9; c' = 8.3; T = 45; spicule 40 um; ventromedian supplements 3; lateral guiding pieces 7 um; odontostyle 4 um; odontophore 13 um; oesophagus 300 um; basal expansion 141 um; prerectum 81 um; rectum 44 um; tail 215 um; ABD 26 um.

Description :

Female : Body almost straight upon fixation, cylindroid, 1.5 - 1.7 mm long, tapering towards extremities. Cuticle thick, about 2 um at midbody, 3 um at tail portion, finely, transversely striated. Lateral chords glandular, about one-fourth body width wide at midbody; lateral body pores distinct, arranged in a single row, widely spaced. Lip region narrow, continuous, amalgamated, truncated with a non-sclerotized peri-oral

disc. Cephalic sclerotization absent. Odontostyle small, about one-half lip width long, asymmetrical, moderately sclerotized, lumen and aperture distinct. Guiding ring single, located at 5 - 6 um from anterior end. Amphids cup-shaped, duplex, about 3 -3.5 um wide, located at the base of peri-oral disc, apertures slit-like Odontophore weakly sclerotized, simple, rod-like, about 3 odontostyle lengths long. Anterior part of oesophagus a slender tubular structure. Basal expanded part fusiform, about 46 - 47% of total oesophageal length long, enclosed in a moderately thick sheath of sinistrally spiral muscles. Junction of anterior and posterior part of oesophagus continuous. Nerve ring located at 109-118 um from anterior end. Cardia short, broadly rounded or tongue-shaped with bluntly pointed tip, about two-fifths to one-third corresponding body width long . Intestine narrow at the oesophago-intestinal junction.

Reproductive system mono-opisthodelphic. Vulva pre-equatorial, transverse, opening wide, not sclerotized. Vagina almost globular, more than one-half body width deep, similar to the genus ***Belondira*** . Anterior uterine branch about 1.8 corresponidng body widths long, filled with spindle-shaped sperms. Posterior branch well developed. Uterus a glandular sac. Disticnt sphincter present at oviduct-uterus junction. Oocytes arranged in a single line except near tip. Egg long, cylindroid, about 147 um long, 27 um wide. Prerectum about 3.5-4 anal body widths long. Rectum longer than one anal body width. Anus a wide, transverse slit. Tail long cylindroid upto 25-27% and then tapers to long filiform with blunt tip Caudal papillae 3 on each side.

Male: Similar to females. Testes paired, outstretched, dorylaimoid. Sperms spindle -shaped. Spicules slender, arcuate with bluntly pointed tip, about 1.5 anal body

widths long. Lateral guiding pieces indistinct, less than one-fifth spicular length long. Ventromedian supplements 3 and an adanal pair, regularly spaced, end within prerectum range. Prerectum about 3 anal body widths long. Rectum about 1.7 anal body widths long. Tail similar to females with 3 caudal papillae on both sides

Type habitat and locality: Soil around roots of robusta coffee (***Coffea canephora***) plants from Cannancadoo Estate, Kodagu Distt.

Type material: Collected in August 1993. Holotype female on slide ***Paraoxybelondira mayili*** n.gen., n. sp./1 and paratype female and male on slides ***Paraoxybelondira mayili*** n. gen., n. sp./2-3.

GENUS *DURIELLA* N. GEN.

In the present study, soil samples collected from different localities of Malnad yielded a new genus of the subfamily Swangeriinae which is described and illustrated. The name ***Duriella elongatus*** n. gen., n. sp. is proposed for its reception. The new genus is characterized in having a spindle-shaped basal part of oeosphagus without muscular covering, isthmus-like cardia and amphidelphic gonads.

Diagnosis : Body moderate-sized, slender, straight to slightly ventrally arcuate upon fixation, tapering towards extremities. Lip region continuous, rounded, amalgamated. Cuticle thin, finely transversely striated. Amphids stirrup-shaped, apertures concave slit-like, duplex. Cephalic sclerotization weak. Odontostyle small, less than lip width long, lumen and aperture narrow. Guiding ring single. Odontophore simple, rod-like, more than one odontostyle length long. Anterior part of oesophagus a slender tubular structure. Posterior expanded part spindle-shaped, 32 - 36% of total oesophageal length, not enclosed in muscular sheath. Cardia elongate, isthmus-like with intestine attached to its posterior tip. Female reproductive system amphidelphic, vulva transverse, pre-equatorial. Males with arcuate spicules, slender, notched in the middle, lateral pieces small. Ventromedian supplements 4 and an adanal pair. Prerectum about 5 - 7 anal body widths long. Tails elongate-conoid then very long filiform, whip-like, similar in sexes.

Type and only species :

Duriella elongatus n.sp.

Relationship : ***Duriella*** n.gen. comes closer to ***Qudsiella*** Jairajpuri, 1967 and ***Paraqudsiella*** Siddiqi, 1981 in general body structure. From ***Qudsiella***, it differs in having longer body, basal expanded part of oesophagus without muscular sheath, odontostyle not attenuated and in having long filiform, whip-like tail (L = 0.9 mm; basal expanded part of oesophagus enclosed in a muscular sheath, odontostyle attenuated and long and tail not whip-like in ***Qudsiella***). Further, from ***Paraqudsiella*** it differs in having longer body, basal expansion, amphidelphic gonads, very long whip-like tail and in the presence of males (L = 0.47 - 0.55 mm; basal expansion one-fourth oesophageal length; gonads mono-ophisthodelphic and males absent in ***Paraqudsiella***).

DURIELLA ELONGATUS N.SP.

(Fig. 21)

Measurements :

Holotype female : L = 2.2 mm; a = 82.5; b = 9.1; c = 5.7; c' = 20; V = 31; G1 = 9.6; G2 = 11.6; odontostyle 4 um; odontophore 7.5 um; oesophagus 241 um; basal expanded part 87 um; prerectum 112 um; rectum 16 um; tail 382 um; ABD 19 um.

Paratype females (n = 2) : L = 2.0 mm; a = 84.2 - 84.7; b = 9.4 - 9.8; c = 5.6 - 6.8; c' = 18.2 - 21.7; V = 34 - 37; G1 = 11.4 - 17; G2 = 13 - 13.7; odontostyle 4 um; odontophore 7.5-8 um; oesophagus 209-213 um; basal expansion 68 - 76 um; prerectum 83-88 um; rectum 23.5-26.5 um; tail 294-368 um; ABD 16-17 um.

Paratype males (n = 3) : L = 1.6 - 2.3 mm; a = 63.2-91; b = 8.1-10.4; c = 5.6-7.3; c' = 11.2 - 19.2; T = 28 - 43.5; spicule 35 - 37 um; lateral guiding pieces

9 - 10 um; ventromedian supplements 4; odontostyle 4 um; odontophore 7.5 - 8 um; oesophagus 200 - 219 um; basal expansion 100 - 109 um; prerectum 74 - 118 um; tail 222 - 364 um; ABD 18 - 20 um.

Description :

Female : Body moderate, about 2 mm long, straight to very slightly curved upon fixation, tapering towards extremities. Cuticle finely, transversely striated, about 1 um thick at midbody, 2 - 3 um at tail. Lateral chords about one-fourth body width wide at midbody. Lip continuous, amalgamated, rounded. Cuticularized refractive elements present around stomal aperture. Amphids cup-shaped, duplex, about 5 - 6 um wide, apertures concave, sensillar pouches well behind the base of odontophore. Guiding ring single, obscure, located much anterior, 2 - 2.5 um from anterior end. Odontostyle small, weakly sclerotized, less than lip width long, slightly asymmetrical, ventral arm angular, lumen and aperture narrow. Odontophore about two odonstostyle lengths long, weakly sclerotized, simple, rod-like. Anterior part of oesophagus a very slender tubular structure. Posterior expanded part spindle-shaped, about 32 - 36% of total oesophageal length; muscular sheath absent. Nerve ring located at 97 - 110 um from anterior end. Cardia long, isthmus-like, about one-half to slightly more of body width long, intestine attached to its posterior end. Oesophageal galnd nuclei and their orifices are located as follows :

DO	71 - 73	S_1N_1	84 - 85
DN	73 - 75	S_1N_2	88 - 89
DO - DN	2.5 - 3	S_2N	92 - 92.5
		S_2O	92 - 93

Reproductive system amphidelphic. Vulva transverse, pre-equatorial, vulva-vagina junction not sclerotized. Vagina about one-half corresponding body width deep, tubular proximally and broad distally, distinct sphincter muscles form band-like structure on the vagina. Uterus a glandular structure filled with spindle-shaped sperms. Distinct spincter present at oviduct-uterus junction. Ovaries long, 20-25 oocytes arranged in a single row except at tip. Prerectum about 5-6 anal body widths long. Rectum more than one anal body widths long Anus a transverse slit. Tail elongate-conoid then tapers to long, filiform, whip-like, about 18 - 22 anal body widths long. Caudal pores obscure, two on each side

Male : Similar to females. Tail portion more arcuate. Testes dorylaimoid, paired, opposed, sperms spindle-shaped. Spicules slender, notched at middle, bluntly pointed at tip, about two anal body widths long medially, moderately sclerotized. Lateral guiding pieces about 9 - 11 um long, bulged at the proximal end. Ventromedian supplements 4, widely spaced and an adanal pair, extends little above prerectum level. Tail similar to females, long filiform, whip-like.Caudal pores two on each side, obscure.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) from the bank of river Tunga, Sringeri.

Type material : Collected in May, 1993. Holotype female on slide, ***Duriella elongatus*** n.gen., n.sp./1 and paratype females and males on slides ***Duriella elongatus*** n.gen , n.sp./2-4.

SUPERFAMILY TYLENCHOLAIMOIDEA FILIPJEV, 1934

The superfamily Tylencholaimoidea is also a highly diversified group of nematodes representing different types of genera, some with unique and quite distinct characters. It was considered a subfamily under Dorylaimidae for the genus ***Tylencholaimus*** De Man, 1876 by Filipjev (1934). Several workers have proposed familial and subfamilial ranks and a number of genera. Leptonchoidea Thorne, 1935 and Encholaimoidea Golden and Murphy, 1967 were synonymised with Tylencholaimoidea by Siddiqi (1982) and Jairajpuri and Ahmad (1992) respectively. Thorne (1935) had erected the family Leptonchidae. The subfamilies Tyleptinae and Tylenchplaimellinae were proposed by Jairajpuri in the year 1964. He (l.c.) also proposed the family Aulolaimoididae the same year. Clark (1961), Jairajpuri, (1964, 1965), Heyns (1963), Lordello (1955), Siddiqi and Khan (1964) and Thorne (1964) proposed various genera under this group. Siddiqi (1969) while revising the classification of Dorylaimoidea recognised no subfamily under Leptonchidae. Khera (1970) revised the classification of the group and proposed ***Bertzuckermania*** in Leptonchinae. Ferris (1971) raised Leptonchidae to superfamilial rank. Ferris and Ferris (1974, 1975, 1976) in a series of publications revised the classification of Leptonchoidea with five families, viz., Leptonchidae, Tylencholaimellidae, Aulolaimoididae, Dorylaimoididae and Encholaimidae. Andrássy (1976) recognised six families under Leptonchoidea. Ferris, Ferris and Goseco (1981) proposed a phylogenetic classification for the family Leptonchidae and recognised three subfamilies

under it. Siddiqi (1982) mentioned that the subfamily Tylencholaiminae Filipjev, 1934 has priority over Leptonchinae Thorne, 1935 and hence the superfamily name should be Tylencholaimoidea rather than Leptonchoidea. He (l.c.) recognised only two families viz., Tylencholaimidae and Leptonchidae under it. Jairajpuri and Ahmad (1992) considered only four families, viz., Tylencholaimidae, Leptonchidae, Mydonomidae and Aulolaimoididae under Tylencholaimoidea and synonymised Encholaimidae, Belonenchidae, Tyleptidae, Basirotyleptidae and Tylencholaimellidae with Leptonchidae.

In the present study, it is observed that nematodes of the Superfamily Tylencholaimoidea are widely distributed in the Malnad tracts. Almost all the soil samples collected were having at least one genus of this group.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle and subcuticle generally with fine or coarse transverse striations, subcuticle loose, with radial striations and fixation folds. Musculature meromyrian type. Lip region continuous or set off; usually rounded and labial papillae not raised. Labial disc may be present or absent. Inner liplets around oral aperture may be present. Odontostyle symmetrical or asymmetrical, solid or acicular, axial. Odontophore simple, rod-like or arcuate, with or without basal knobs or flanges. Oesophagus may be slender, ending in small pyriform or cylindroid basal bulb or dorylaimoid type. Triquetrous chamber may be present in the basal bulb. Intestine oligocytous. Vulva transverse or longitudinal. Males with arcuate spicules, lateral pieces and few ventromedian supplements. Tails variable in size and shape; similar in both the sexes.

Type family :

Tylencholaimidae Filipjev, 1934

Other families :

Leptonchidae Thorne, 1935

Auloiaimoididae Jairajpuri, 1964

Mydonomidae Thorne, 1964

FAMILY TYLENCHOLAIMIDAE FILIPJEV, 1934

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle loose with fixation folds and radial striations.Body pores indistinct.Lip region cap-like, usually set off by constriction; lips angular and labial papillae not raised Labial disc around the oral aperture may be present. Amphids variable in shape with slit or pore-like apertures. Odontostyle small, dorylaimoid, symmetrical or asymmetrical, aperture distinct.Odontostyle simple, rod-like or with basal knobs or flanges. Guiding ring single. Oesophagus dorylaimoid, basal expansion with thickened inner lining. Cardia generally hemispheroid Female reproductive system amphidelphic or monodelphic Vulva longitudinal or transverse. Males with well developed spicules, lateral guiding pieces and ventromedian supplements. Tails almost rounded to long filiform, similar in sexes.

Type subfamily :

Tylencholaiminae Filipjev, 1934

Other subfamilies :

Xiphinemellinae Jairajpuri, 1964

Vanderlindiinae Siddiqi, 1969

Mumtaziinae Andrássy, 1976

SUBFAMILY TELENCHOLAIMINAE FILIPJEV, 1934

Diagnosis : (After Jairajpuri and Ahmad, 1992).Body small to medium-sized, cuticle and subcuticle finely, transversely striated with radial striations and fixation folds. Lip set off from body contour, amalgamated, labial papillae not raised. Labial disc may be present around oral aperture. Amphids small, apertures slit or pore-like.Odontostyle simple, rod-like, basally thickened or with distinct knobs. Basal expanded part of oesophagus elongate-cylindroid. Female reproductive system mondelphic or amphidelphic. Vulva transverse or longitudinal. Males with well developed spicules, lateral guiding pieces and spaced ventromedian supplements. Tails rounded to elongate-conoid; similar in sexes.

Type genus :

Tylencholaimus De Man, 1876

Other genera :

Discomyctus Thorne, 1939

Uthanema Thorne, 1939

Meylonema Andrássy, 1960

Chitwoodius Furstenberg and Heyns, 1966

Capilonchus Siddiqi, 1982

Tantunema Siddiqi, 1982

Sclerolaimus Jairajpuri and Ahmad, 1992

Rostrulium Siddiqi, 1995

GENUS *TYLENCHOLAIMUS* DE MAN, 1876

Those nematodes which resembled ***Dorylaimus*** but with knobed odontophore were separated and the genus ***Tylencholaimus*** was erected by De Man in 1876 This genus was considered as the type genus of the subfamily Tylencholaiminae under Dorylaimidae by Filipjev (1934) Several species were transferred from ***Tylencholaimus*** to other genera by Thorne (1939) Later on several workers have added more species under this genus Loof and Jairajpuri (1968) revised the genus and provided a key to the species Tylencholaiminae was raised to familial rank by Siddiqi (1969) Jairajpuri and Ahmad (1992) had split the genus into seven subgenera and the species, ***T. paradoxus*** was proposed as a new genus ***Sclerolaimus*** Santiago and Coomans (1994) while reviewing the genus ***Tylencholaimus*** did not accept Jairajpuri and Ahmad's (1992) view of spilitting it into subgenera They (l c) recognised only species with prodelphic and amphidelphic gonads However, they have not described opisthodelphic species in that paper In the present work, it is felt that the poposal of Jairajpuri and Ahmad (1992) to split the genus into subgenera is justifiable because it facilitates proper grouping of the species and the same has been followed

Diagnosis : (Emended) Body wide, cylindroid, usually less than 1 5 mm long Cuticle and subcuticle finely, transversely striated Radial striations present Lip set off, cap-like Amphids with cyathiform or elongate-conoid fovea Odontostyle dorylaimoid, almost one lip width long Guiding ring single Odontophore simple, rod-like or with basal knobs Oesophagus

dorylaimoid. Cardia hemispheroid or bluntly conoid. Female reproductive system monodelphic or amphidelphic. Vulva transverse. Males with dorylaimoid spicules, lateral guiding pieces present or absent, ventromedian supplements few, widely spaced. Tails hemispheroid, elongate-conoid or bluntly rounded; similar in sexes.

Type subgenus :

Tylencholaimus (De Man, 1876), Jairajpuri and Ahmad, 1992

Other subgenera :

Amphitylencholaimus Jairajpuri and Ahmad, 1992

Disctylencholaimus Jairajpuri and Ahmad, 1992

Leptotylencholaimus Jairajpuri and Ahmad, 1992

Opisthotylencholaimus Jairajpuri and Ahmad, 1992

Protylencholaimus Jairajpuri and Ahmad, 1992

Pseudotylencholaimus Jairajpuri and Ahmad 1992

SUBGENUS *TYLENCHOLAIMUS* (DE MAN, 1876) JAIRAJPURI AND AHMAD, 1992

The genus *Tylencholaimus* De Man, 1876 was split into seven subgenera and *Tylencholaimus* was proposed as its type subgenus by Jairajpuri and Ahmad (1992) for those species with set off lip region, odontophore with distinct basal knobs and mono-prodelphic gonad *T. (T.) mirabilis* (Bütschli, 1873) De man, 1876 was regarded as its type species. Jairajpuri and Ahmad (1992) synonymised *Xenonchium cedari*

Siddiqi, 1964 under the subgenus ***Tylencholaimus.*** In this study ***Tylencholaimus ibericus*** Santiago and Coomans, 1994 is considered as subgenus and the same is reported. ***T. (T.) ibericus*** is reported for the first time from India which was collected from the Malnad tracts during the course of this study.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region set off by constriction, inner papillae slightly projecting. Amphids cyathiform. Odontostyle dorylaimoid, as long as one lip width long, apertures about one third its length. Odontophore with distinct basal knobs. Oesophageal expansion generally abrupt. Female reproductive system mono-prodelphic; short post-uterine sac may be present or absent. Tails short-conoid to hemispheroid; similar in sexes.

Type species :

Tylencholaimus (Tylencholaimus) mirablis (Bütschli, 1873) De Man, 1876

Other species :

There are some 17 species under this genus including ***T. (T.) ibericus*** (Santiago and Coomans, 1994) n. comb. and two ***species inquirendae***.

For list of species refer Jairajpuri and Ahmad (1992)

TYLONCHOLAIMUS (TYLENCHOLAIMUS) IBERICUS (SANTIAGO AND COOMANS, 1994) N. COMB.

(Fig. 22)

Measurements :

Female (n = 6) : L = 0.5 - 0.6 mm; a = 25.5 - 27 (26.6 ± 0.9); b = 3.5 - 4.3 (3.8 ± 0.4); c = 24.4 - 30.9 (27.6 ± 2.9); c' = 1.3 - 1.5; V = 59 - 70

(66 ± 5 5); G1 = 28 - 31.5; odontostyle 5 - 6 um; odontophore 6 um, oesophagus 115 - 162 um; basal expansion 47 - 66 um; nerve ring 51 - 66 um, prerectum 51.5 - 78 (60 ± 14) um; rectum 10 - 22 um; tail 18 - 20 um, ABD 13 - 15 um.

Male : Not found.

Habitat and locality : Soil around roots of grasses (unidentified) and paddy (***Oryza sativa***) from Muthinakoppa

Remarks : The present specimens conform well with the original description of ***T.(T.) ibericus*** Santiago and Coomans, 1994 except in having longer tail (tail 13 - 16 um; c = 31.6 - 41.2; c' = 0.9 - 1.1 in the type material) ***T. (T.) ibericus*** is reported for the first time from India.

SUBGENUS *AMPHITYLENCHOLAIMUS* JAIRAJPURI AND AHMAD, 1992

The subgenus ***Amphitylencholaimus*** was erected by Jairajpuri and Ahmad (1992) for those species of the genus ***Tylencholaimus*** which are having amphidelphic gonads. ***T. (A.) teres*** Thorne, 1939 was proposed as its type species by them. Very few species were described under this subgenus In the present study, soil samples collected from Karnataka state yielded one known and a new species of this subgenus and these are described and illustrated. The new species ***T. (A.) cosmos*** is quite widespread in the Malnad tracts.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region set off by deep constriction, cap-like. Amphids with cyathiform fovea, apertures slit-like Odonotstyle dorylaimoid, short, aperture about one-third its length Odontophore with small to well-developed basal knobs. Oesophageal expansion gradual. Female reproductive system amphidelphic. Tails short-conoid to hemispheroid; similar in sexes.

Type species :

Tylencholaimus (Amphitylencholaimus) teres, Thorne, 1939

Other species :

T.(A.) congestus Loof and Jairajpuri, 1968

T. (A.) crassus Loof and Jairajpuri, 1968

T. (A.) innebus Ahmad and Jairajpuri, 1980

T. (A.) mangolicus Andrássy, 1967

T. (A.) paracrassus Monteiro, 1970

T. (A.) savaryi Loof and Jairajpuri, 1968

T. (A.) suryawanshi Ali and Chisty, 1972

T. (A.) tahatikus (Yeates, 1967) Siddiqi, 1968

T. (A.) cosmos n sp

AMPHITYLENCHOLAIMUS TERES THRONE, 1939

Meausrements :

Female (n = 3) : L = 1 mm, a = 31 - 33 8, b = 4 1 - 4 7, c = 54 - 56 3, c' = 0 8, V = 62 - 63, G1 = 17 - 19, G2 = 14 5 - 16, odontostyle 6 um, odontophore 7 5 - 8 um, guiding ring 5 um, oesophagus 213 - 217 um, basal expanded part 92 - 96 um, cardia 14 - 16 um, nerve ring 80 - 81 um, prerectum 102 - 108 um, rectum 23 - 24 um, tail 16 - 18 um, ABD 22 - 23 5 um

Male : Not found

Habitat and locality : Soil around roots of grasses (unidentified) and paddy (*Oryza sativa*) form Muthinakoppa

Remarks : The present specimens conform well with the original description of *T. (A.) teres* Thorne, 1939 except in having slightly wider body, in anal body diameter and in the absence of males (body width 26 - 27 um vs 28-29 um, ABD 19 - 22 um vs 22 - 23 5 um and males were reported for the type material)

AMPHITYLENCHOLAIMUS COSMOS N.SP.

(Fig 22)

Measurements :

Holotype female : L = 0 7 mm , a = 30 8 , b = 3 9, c = 37 9, c' = 1 3, V = 61, G1 = 10 7, G2 = 9 8, odontostyle 8 um, odontophore 14 um, oesophagus 187 um, basal expansion 81 um, prerectum 50 um, rectum 25 um, tail 19 um, ABD 15 um

Paratype females (n = 8) : L = 0 7 - 0 9 (0 7 ± 0 1) mm, a = 29 2 - 34 8 (31 8 ± 2 4), b = 3 5 - 4 7 (3 9 ± 0 3), c = 35 3 - 38 5 (37 ± 1 1), c' = 1 1 - 1 3, V = 57 - 61, G1 = 9 - 24, G2 = 10-17, odontostyle 7 5-8 um, odontophore 12 - 14 um, oesophagus 179 - 207 (190 5 ± 10) um, basal expansion 73 5 - 87 (80 ± 4 4) um, prerectum 22 - 66 (49 ± 14 7) um, rectum 15 - 25 um, tail 19 - 22 um, ABD 15 - 20 5 (17 ± 2) um

Description :

Female : Body slender, less than 1 mm long, subcylindroid, slightly arcuate upon fixation Cuticle thin, finely transversely striated, subcuticle intact Lateral chords about one-third body width wide at midbody Lip region set off by depression, amalgamated, cap-like, about 7 5 um wide, 3 um high, papillae distinct Amphids small, cyathiform , less than one-half lip width wide Odontostyle dorylaimoid, straight, about one lip width long with distinct aperature and lumen Guiding ring single Odontophore straight, distinctly longer than odontostyle, basal portion with minute knobs Anterior part of oesophagus a slender tubular structure, gradually enlarges to a cylindroid basal part Basal expansion about 40 - 43% of total oesophageal

length. Nerve ring located at 69 - 82 um from anterior end. Cardia small, bluntly conoid, about 4 - 9 um long. Oesophageal gland nuclei and their orifices are located as follows :

DO	64 - 66	S_1N_1	77 - 79
DN	68 - 70	S_1N_2	79 - 82
DO - DN	3.9-4.1	S_2N	95 - 96
		S_2O	95 - 96

Reproductive system amphidelphic. Vulva transverse, post-equatorial, not sclerotized. Vagina about one-half corresponding body width deep. No cells were observed around the vagina. Uterus and oviduct without distinct sphincter differentiation. Both the gonads almost equally developed. Oocytes arranged in a single line except near tip. Prerectum distinct, about 1.4 - 3.8 anal body widths long. Rectum as long as anal body width or slightly more. Tail short, 1.1 - 1.3 anal body widths long, dorsally convex with bluntly rounded tip.

Male : Not found.

Type habitat and locality : Soil around roots of guava tree from Sampigekan Estate, Chikmagalur Distt.

Type material : Collected in May, 1993. Holotype female on slide ***Amphitylencholaimus cosmos*** n.sp./1 and paratype females on slides ***Amphitylencholaimus cosmos*** n.sp./2-4.

Relationship : ***Amphitylencholaimus cosmos*** n.sp. closely resembles ***T. (A.) congestus*** Loof and Jairajpuri, 1968 and ***T. (A.) crassus*** Loof and Jairajpuri, 1968. From ***T. (A.) congestus*** it distinctly differs in the absence

of large cells around vagina, slender body, longer odontophore and longer tail (large cells around vagina prominent; body width 26 um vs 21 - 24 um tail 18 um; c = 40 - 46 and odontophore 9 um in ***T. (A.) congestus***). From ***T. (A.) crassus***, it differs in the body posture upon fixation, tail shape, slender body, longer odontophore, in the absence of post-rectal sac and intact subcuticle (body striaght upon fixation; inner cuticle loose, tail bluntly conoid; odontophore 10.5 - 11 um; body width 31 - 35 um vs 21 - 24 um; a = 19.7 - 22.2; ABD 20 - 24 um and post-rectal sac present in ***T. (A.) crassus***).

SUBGENUS *OPISTHOTYLENCHOLAIMUS* JAIRAJPURI AND AHMAD, 1992

Jairajpuri and Ahmad (1992) erected the subgenus ***Optishotylencholaimus*** for those species of ***Tylencholaimus*** De Man, 1876 with mono-opisthodelphic gonad. They proposed ***T. (P.) gertii*** Kruger, 1965 as its type species. Very few species were included under this subgenus. In the present study, a soil sample collected from the Malnad tracts yielded female specimens of this subgenus which on detailed studies showed it to be a new species and the same is described with illustrations.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region set off by constriction or depression. Odontostyle small, aperture about one-third of its length. Odontophore with indistinct knobs. Oesophageal expansion gradual. Cardia bluntly rounded. Female reproductive system mono-opisthodelphic, anterior branch completely absent. Tails short-conoid to hemispheroid.

Type species :

Tylencholaimus (Opisthotylencholaimus) gertii Kruger, 1965

Other species :

T. (O.) pakistanensis Timm, 1964

T. (O.) rossi, Yeates, 1979

T. (O.) zealandicus De Man, 1876

T. (O.) karnataki n.sp.

OPISTHOTYLENCHOLAIMUS KARNATAKI N.SP.

(Fig. 22)

Measurments :

Holotype female : L = 0.6 mm; a = 34.8; b = 3.5; c = 34.8 c' = 1.4; V = 50, G2 = 15; odontostyle 7.5 um; odontophore 8 um, oesophagus 178 um, expanded part of oesophagus 73.5 um; prerectum 35 um; rectum 16 um; tail 18 um; ABD 12.5 um.

Paratype female (n = 1) : L = 0.5 mm; a = 31.1; b = 3.6; c = 34.2; c' = 1 3, V = 46; G2 = 23.7; odontostyle 7 um; odontophore 7 um; oesophagus 141 um; expanded part of oesophagus 62 um; prerectum 38 um; rectum 15 um, tail 15 um; ABD 12 um.

Description :

Female : Body small, less than 1 mm; slightly ventrally arcuate upon fixation. Cuticle finely, transversely striated. Lateral chords about one-third body width wide at midbody. Radial striae absent. Lip set off by depression, broad, flatened, amalgamated, about 7 um wide, 2 um high. Amphids small, fovea about 3 um wide, 7 um long, conical-shaped, sensilla well below the base of odontophore, apertures slit-like. Guiding ring single. Odontostyle straight, about one lip width long, aperture and lumen distinct. Odontophore straight, basal portion with minute knobs. Anterior oesophagus slender, tubular, expansion gradual. Basal expanded part cylindroid, moderately muscular, about 41 - 44% total oesophageal length. Nerve ring at 66 - 72 um from anterior end. Cardia small, bluntly rounded or conoid, 4 - 6 um long. DN at some distance from DO.

Reproductive system mono-opisthodelphic. Anterior branch completely absent. Vulva transverse, almost equatorial, not sclerotized. Vagina about one-half body width deep, walls weakly sclerotized. Posterior reproductive branch with usual organs. Oviduct-uterus junction with weak sphincter. Oocytes arranged in a single line except at lip. Prerectum short, about 2.7 - 3.3 anal body widths long. Rectum as long as or slightly longer than anal body width. Tail more than one anal body widths long, dorsally convex, bluntly rounded. Caudal papillae obscure.

Male : Not found.

Type locality and habitat : Soil around roots of cinnamom tree from Lower Giris, Karnataka state.

Type material : Collected in June, 1993. Holotype female on slide ***Opisthotylencholaimus karnataki*** n.sp./1 and paratype female on slide ***Opisthotylencholaimus karnataki*** n.sp./2.

Relationship :*Opisthotylencholaimus karnataki* n.sp. distinctly differs from the other species in having wide and flat lip region and conical-shaped amphids. It closely resembles ***T. (O.) pakistanensis*** Timm, 1964; ***T. (O.) gertii*** Kruger, 1965 and ***T. (O.) rossi*** Yeates, 1979. From ***T. (O.) pakistanensis*** it differs in having greater a, c, c' values, posteriorly located vulva, larger basal expansion of oesophagus and shorter rectum (a = 18 - 19.6; c = 30.8 - 32.3; c' = 1.0; V = 44.4 - 46.7; rectum 1.7 anal body widths long vs 1.3 - 1.5; basal expansion 27 - 33% in ***T. (O.) pakistanensis***). Further, it can be differentiated from ***T. (O.) gertii***

in the absence of anterior uterine branch, longer rectum and posteriorly located vulva (anterior uterine branch present, rectum about one anal body width long; V = 46 in ***T. (O.) gertii***). It also differs from ***T. (O.) rossi*** in having anteriorly placed vulva, more a, c' and G2 values, longer odontostyle, rectum and in the shape of tail (V = 54 - 58; a = 23 -24; c' = 0.8 - 0.9; G2 = 11 - 17; odontostyle 6 um; rectum about 1 ABD and tail terminus blunt and angular in ***T. (O.) rossi***).

SUBGENEUS *PROTYLENCHOLAIMUS* JAIRAJPURI AND AHMAD, 1992

Species of the genus ***Tylencholaimus*** De Man, 1876 which were having mono-prodelphic gonad with a definite post-uterine sac were erected as the subgenus ***Protylencholaimus*** by Jairajpuri and Ahmad (1992). ***T. (P.) stecki*** Steiner, 1914 was proposed as its type species by them and ***T. (P.) maritus*** Loof and Jairajpuri, 1968 was the only other species included. They did not include ***T.(P.) rumjhumi*** Khan and Laha, 1983. ***T. alpinus*** Vinciguerra, 1982 was synonymised with the type species by the same authors the same year.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Lip region set off by depression, labial papillae not protruding. Odontostyle shorter, smaller than lip width. Odontophore with distinct basal knobs. Anterior part of oesophagus moderately muscular. Oesophageal expansion gradual. Female reproductive system mono-prodelphic, post-uterine sac present. Tails short, hemispheroid to bluntly rounded; similar in sexes.

Type species :

Tylencholaimus (Protylencholaimus) stecki Steiner, 1914

Other species :

T. (P.) maritus Loof and Jairajpuri, 1968

T. (P.) rumjhumi Khan and Laha, 1983

T. (P.) longisacca n.sp.

PROTYLENCHOLAIMUS LONGISACCA N.SP.

(Fig 23)

Measurements :

Holotype female : L = 1 1 mm, a = 33 8, b = 5 0, c = 57 2, c' = 0 8, V = 64 6, G1 = 24 5, G2 = 12, odontostyle 6 um, odontophore 8 um, oesophagus 218 um, basal exapansion 93 um, prerectum 154 um, rectum 28 um, tail 19 um, ABD 25 um

Paratype females (n = 6) : L = 0 9 - 1 1 (1 ± 0 1) mm, a = 34 - 37 4 (34 8 ± 1 7), b = 4 6 - 5 (4 7 ± 0 3), c = 44 1 - 57 2 (49 7 ± 5 2), c' = 0 8 - 1 0, V = 65 - 76 (69 6 ± 4 0), G1 = 19 - 36, G2 = 7 2 - 18 3, odontostyle 6 - 7 um, odontophore 7 5 - 8 um, oesophagus 198 - 221 um (208 ± 11) um, basal expansion 78 - 101 (89 ± 9 7) um, prerectum 88 - 181 (135 ± 35) um, rectum 21 - 27 um, tail 18 - 22 (19 7 ± 1 5) um, ABD 21 - 25 (22 ± 2 0) um

Paratype males (n = 2) : L = 1 0 mm, a = 37 - 39 , b = 5 - 5 1, c = 47 - 54, c' = 0 9, T = 57 5 - 60, spicule 28 - 31 um, ventromedian supplements 3, odontostyle 6 um, odontophore 7 5 um, oesophagus 201 - 207 um, basal expansion 78 - 81 um, prerectum 196 - 221 um, rectum 34 - 41 um, tail 19 - 22 um, ABD 22 - 24 um

Description :

Female : Body slender, cylindroid, ventrally arcuate upon fixation, about 1 mm long Refractive radial striae abundant Cuticle finely, transversely striated Inner cuticle loose Lateral chords about one-third body width wide

at midbody. Lateral body pores indistinct. Lip region set off by shallow depression, cap-like , middle portion slightly projecting, about 9 um wide, 2 - 4 um high. Amphids small, fovea cyathiform, about one-half lip width wide, apertures slit-like. Odontostyle moderately sclerotized, straight, about two-thirds lip width long, aperture and lumen narrow. Odontophore straight, basal knobs distinct. Guiding ring single. Anterior part of oesophagus moderately muscular, expansion of oesophagus gradual. Expanded part occupying 38 - 47% total oesophageal length, muscular. Nerve ring at 81 - 88 um from anterior end. Cardia small, 8 - 12 um long, bluntly rounded or conoid DN at a distance from DO. SVN obscure. S_2N and S_2O much posterior. Location of oesophageal gland nuclei and their orifices are as follows :

DO	62 - 66	S_1N_1	81 - 82
DN	63 - 67	S_1N_2	81 - 82
DO - DN	3.5 - 4	S_2N	91 - 93
		S_2O	92 - 93

Reproductive system mono-prodelphic. Vulva transverse, not sclerotized, inclined anteriad, anterior lip often protruding over the posterior. Vagina less than one-half body width deep, weakly sclerotized Anterior gonad well developed, often eggs observed in the uterine sac Strong sphincter present at oviduct-uterus junction. Oocytes arranged in a single line except at tip. Post-uterine sac very long, about 74 - 176 um or 7 - 18% of total body length, often in two parts filled with radially arranged, spindle-shaped sperms. Prerectum 4.3 - 8.8 anal body widths long. Rectum about 21 - 28 um long. Tail short, hemispheroid, filled with protoplasmic core.

Male : Similar to females. Tail portion more arcuate. Rectum and prerectum comparatively longer than females. Testes dorylaimoid, paired, outstretched, spindle-shaped sperms seen. Spicule without median canal, almost hollow, often protruded out upon fixation, arcuate, about 1.2 - 1.3 anal body widths long medially. Lateral guiding pieces apparently absent. Ventromedian supplements 3 and an adanal pair, widely, irregularly spaced, first supplement starts about 3 tail length above cloaca. Prerectum much above ventromedian supplement range. Tail similar to females, slightly less than one anal body width long.

Type habitat and locality : Soil around roots of citrus plants (***Citrus reticulata***) from Navodhaya complex, Chikmagalur Distt.

Type material : Collected in February, 1993. Holotype female on slide ***Protylencholaimus longisacca*** n.sp./1 and paratype females and males on slides ***Protylencholaimus longisacca*** n.sp./2-4.

Relationship : ***Tylencholaimus (Protylencholaimus) longisacca*** n.sp. closely resembles ***T. (P) stecki*** Steiner, 1914 particularly in the shape of spicules and in the number of ventromedian supplements, but it distinctly differs from the latter in having posteriorly located vulva, longer testes, in the b, c ratios, distance between cloaca and first ventromedian supplement and greater prerectum anal body width ratio. (b = 3.7 - 4.3; c = 62 - 74; V = 61 - 64; T = 36 - 41; cloaca and first ventromedian supplement distance about 4 tail lengths; prerectum 5 anal body widths long in ***T. (P) stecki).***

GENUS *DISCOMYCTUS* THORNE, 1939

Thorne (1939) established the genus ***Discomyctus*** with ***D. cephalatus*** as its type species This genus is characterized by having a disc-like structure around the vestibule, abrupt expansion of basal part of oesophagus, mono-prodelphic gonad and long, filiform tail ***Tylencholaimus longicaudatus*** (Imamura, 1931) was also shifted to ***Discomyctus*** Andrássy (1968) and Dhanachand and Jairajpuri (1980) added two more species under this genus Males were so far not known for this genus for the above species In the present study a new species of ***Discomyctus*** was collected along with a male which is described and illustrated

Diagnosis : (Emended) Small-sized nematodes Lip region distinctly discoid, wider than adjoining body, disc-like structure present around the vestibule Odontostyle irregular or regular in contour Guiding ring single Odontophore straight, distinct basal knobs present at the base Anterior part of oesophagus slender, non-muscular. Expansion of oesophagus abrupt, expanded part muscular Female reproductive system mono-prodelphic, post-uterine branch absent Tails long filiform with acute or blunt tip, similar in sexes

Type species :

Discomyctus cephalatus Thorne, 1939

Other species :

D. elongatus Dhanchand and Jairajpuri, 1980

D. longicaudatus (Imamura, 1931) Thorne, 1939

D. nagyi Andrássy, 1968

D. bisexualis n.sp

DISCOMYCTUS BISEXUALIS N.SP.

(Fig 24)

Measurements :

Holotype female : L = 0 7 mm, a = 27 2, b = 2 6, c = 6 0, c' = 7 1, V = 73, G1 = 15 8, odontostyle 7 um, odontophore 10 um, oesophagus 290 um, basal expanded part of oesophagus 143 um, prerectum 59 um, rectum 18 um, tail 115 um, ABD 16 um

Paratype females (n = 6) : L = 0 7 - 0 9 (0 8 ± 0 1) mm, a = 25 4 - 38 1 (33 2 ± 4 2), b = 2 6 - 3 7 (3 1 ± 4 2), c = 6 - 7 4 (7 ± 0 5), c' = 6 3 - 8 5 (7 2 ± 0 8), V = 57 - 73 (62 ± 8), G1 = 11 2 - 15 8, odontostyle 7 - 8 um, odontophore 8 - 10 um, oesophagus 218 - 290 (267 ± 26) um, basal expanded part of oesophagus 103 - 151 (140 ± 18 5) um, prerectum 52-96 (67 ± 16) um; rectum 15 - 18 um, tail 103 - 125 (113 ± 7) um, ABD 15 - 18 um

Paratype male (n = 1) : L = 0 8 mm, a = 35 7, b = 2 8, c = 7 2, c' = 6 8, T = 33 5, spicule 26 um, odontostyle 7 um, odontophore 9 um, oesophagus 279 um, basal expanded part of oesophagus 147 um, prerectum 95 6 um, rectum 21 um, tail 110 um, ABD 18 um

Description :

Female : Body less than 1 mm long, slender, tapering towards extremities, slightly arcuate ventrally upon fixation Cuticle thin, finely transversely sriated Subcuticle some what loose Lateral chords about one-third body width wide at midbody Lip region distinctly set off by depression, discoid, vestibule

surmounted by a disc-like structure. Amphids small, less than one-half lip width wide, fovea cyathiform, apertures slightly concave. Odontostyle slightly irregular in shape, ventral arm bent inwards, 7 - 8 um long, lumen and aperture distinct. Odontophore straight, slightly longer than odontostyle, distinctly knobed at the base. Guiding ring single. Nerve ring at 74 - 82 um from anterior end. Anterior part of oesophagus a very thin, tubular structure, joining with abruptly expanding basal part which is occupying nearly 50 - 55% total oesophageal length. Oesophageal lumen fairly cuticularized. Dorsal oesophageal gland nucleus somewhat oval in shape, far from expansion. Cardia short, bluntly rounded or conoid. Oesophageal gland nuclei and their orifices are located as follows:

DO	53 - 57	S_1N_1	62 - 63
DN	55 - 59	S_2N	90 - 92
DO - DN	2.3 - 3.2	S_2O	90 - 92

Reproductive system mono-prodelphic. Posterior branch completely absent. Vulva transverse, thick walled, not sclerotized. Vagina inclined anteriad, almost bluntly rectangular, less than one-half body width deep. Anterior gonad normally developed. Uterus-oviduct not differentiated by sphincter. Oocytes arranged in a single line except at tip. Prerectum about 3 - 6 anal body widths long. Rectum about one or slightly more anal body width long. Post-rectal sac apparently present. Tail cylindroid, then long filiform with acute tip, 6 - 7 anal body widths long. Protoplasmic core does not enter up to tail tip but remains 47 - 71% of the tail length making hallow tip. Caudal pores indistinct, two on both the sides.

Male : Similar to females, tail more arcuate. Testes poorly developed, paired, outstretched. Spicule 26 um; a simple arcuate hallow structure without lateral guiding pieces. Ventromedian supplement just an adanal pair. Prerectum about 6 anal body widths long, clearly demarcated. Rectum slightly longer than anal body width. Tail similar to females, long filiform with acute tip, protoplasmic core about 54% from anus.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) and grasses (unidentified) from Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Discomyctus bisexualis*** n.sp./1 and paratype females and males on slides ***Discomyctus bisexualis*** n.sp./2-4.

Relationship : ***Discomyctus bisexualis*** n.sp. distinctly differs from the other species of the genus in the presence of males and oval dorsal oesophageal gland nucleus. It closely resembles ***D. longicaudatus*** (Imamura, 1931) Thorne, 1939 and ***D. elongatus*** Dhanachand and Jairajpuri, 1980. However, it can be differentiated from ***D. longicaudatus*** in the presence of males, posteriorly located vulva and shorter prerectum (males absent, V = 58.5; prerectum as long as tail in ***D. longicaudatus***). From ***D. elongatus***, it differs in having males, shorter oesophagus, more c value, lesser c', posteriorly located vulva, longer prerectum and lesser basal expansion of oesophagus (males absent; oesophagus 165 - 180 um; c = 4 - 5; c' = 12 - 13; V = 50 - 53; prerectum 42 - 48 um; basal expansion of oesophagus 50 - 58% in ***D. elongatus***).

GENUS *CHITWOODIUS* FURSTENBERG AND HEYNS, 1966

The genus ***Chitwoodius*** was established by Furstenberg and Heyns (1966) who had initially proposed it as ***Chitwoodia*** the same year ***Chitwoodius transvaalensis*** was proposed as its type species Jairajpuri and Ahmad (1992) recognised only three species under this genus Santiago (1991) while describing two new species provided a polytomous key and recognised 9 species under ***Chitwoodius***. He (l.c) also emended the diagnosis of the genus. In the present study a number of soil samples that were collected from the Malnad tracts yielded two more new species of ***Chitwoodius.*** These are described and illustrated.

Diagnosis : (After Santiago, 1991). Body small to medium-sized Outer cuticle smooth or with transverse strations. Inner cuticle often loose, coarsely striated Radial refractive elements abundant. Lip region set off by constriction, usually cap-like (with peri -oral disc in *C. **heynsi***) Amphids large, fovea cup-shaped. Odontostyle elongate, tubular with narrow lumen and aperture Odontophore rod-like. Slender part of the pharynx more or less muscular, enlarging after mid portion. Vulva - vagina junction fringed or not Vulva transverse, longitudinal or pore-like. Female reproductive system amphidelphic. Tails convex-conoid with rounded terminus; similar in sexes. Spicules dorylaimoid. Ventromedian supplements widely spaced

Type species :

Chitwoodius transvaalensis (Furstenberg and Heyns, 1966)

Furstenberg and Heyns, 1966

Other species :

*C. **fusus*** Sauer, 1969

*C. **undulatus*** Altherr, 1977

*C. **seshadrii*** Baqri, 1980

*C. **brasiliensis*** Siddiqi, 1983

*C. **rusticulus*** Siddiqi, 1983

*C. **retezatensis*** Popovici, 1990

*C. **heynsi*** Santiago, 1991

*C. **parafusus*** Santiago, 1991

*C. **musae*** n sp

*C. **curvistylus*** n sp

CHITWOODIUS MUSAE N.SP.

(Fig 25)

Measurements :

Holotype female : L = 1 9 mm, a = 30 2, b = 4 2, c = 57 2, c' = 0 8, V = 54 8, G1 = 14 8, G2 = 13 7, odontostyle 29 um, odontophore 25 um, oesophagus 456 um, basal expanded part 265 um, prerectum 221 um, rectum 48 5 um, tail 34 um, ABD 44 um

Paratype females (n = 3) : L = 1 9 - 2 2 mm, a = 27 5 -30 3, b = 4 2 - 4 3, c = 57 - 78, c' = 0 6 - 0 8, V = 54 - 55, G1 = 14 - 15, G2 = 13 - 15, odontostyle 28 - 32 um, odontophore 22 - 25 um, oesophagus 458 - 478 um, basal expanded part 260-270 um, prerectum 160-220 um, rectum 44 - 49 um, tail 27 - 35 um, ABD 43 - 44 um

Description :

Female : Body moderate-sized, about 2 mm long,. slightly ventrally arcuate upon fixation. Cuticle finely transversely striated; subcuticle loose and coarsely striated. Lateral chords about one-third body width wide at midbody. Radial refractive elements numerous, arranged in longitudinal rows along the plane of lateral chords. Lip region set off by constriction, lips partially separate, angular, cap-like, narrower than adjoing body. Stoma cylindrical. Amphids about one-third lip width wide, apertures slit-like, stirrup-shaped. Odontostyle about twice as long as lip region, straight, aperture about one-fifth of its length, lumen wide.Guiding ring single, located at about one lip width distance from anterior end. Odontophore simple, rod-like, shorter than odontostyle, pharyngeal muscle bulged at odontophore base. Nerve ring at 140 - 150 um from anterior end. Anterior part of oesophagus comparatively slender, moderately muscular. Expanded part of oesophagus dorylaimoid, cylindroid, about 55 - 60% of total oesophageal length. Cardia about one-third body width long, bluntly conoid.

Female reproductive system amphidelphic. Vulva pore-like, distally fimbriate, vagina about one-half body width deep, almost globular. Uterus sac-like, glandular protrusions observed on the utrerine wall, sperms absent. Sphincter present at oviduct-uterus junction. Ovaries reflexed, oocytes few, arranged in single row except in tip. Prerectum about 4 - 5 anal body widths long. Rectum slightly longer than anal body diameter. Tail short, dorsally convex, bluntly conoid, less than one anal body width long. Caudal pore

single at the tail terminus, looks like a connecting canal between outer and inner cuticle.

Male : Not found.

Type habitat and locality : Collected from soil samples around roots of banana trees (***Musa paradisiaca***) from Nethrakonda Estate.

Type material : Collected in May, 1993. Holotype female on slide ***Chitwoodius musae*** n.sp./1 and paratype females on slides ***Chitwoodius musae*** n.sp./2-4.

Relationship : ***Chitwoodius musae*** n.sp. comes closer to *C. seshadrii* Baqri, 1980 in general morphology. But distinctly differs from it in having lesser a, b values, longer rectum, prerectum, glandular protrusions on the uterine walls, in the presence of canal -like pore at tail terminus and in the absence of males (a = 43 - 48; b = 4.6 - 5.8; rectum 22 - 27 um; prerectum 126 - 193 um; canal-like caudal pore absent at tail terminus; glandular protrusions absent on the uterine walls and males present in *C. seshadrii*).

CHITWOODIUS CURVISTYLUS N.SP.

(Fig. 26)

Measurements :

Holotype female : L = 1.7 mm; a = 34.8; b = 4.3; c = 54; c' = 0.8; V = 57.5; G1 = 15; G2 = 12; oesophagus 384 um; basal expansion 213 um; odontostyle 28 um; odontophore 27 um; prerectum 243 um; rectum 35 um; tail 31 um; ABD 38 um.

Paratype females (n = 8) : L = 1.4 - 1.8 (1.7 ± 0.2) mm; a = 30.2 - 34.8 (32.5 ± 1.8); b = 3.6 - 4.6 (4.3 ± 0.4); c = 44-60 (54.7 ± 5.9); c' = 0.8 - 0.9; V = 50 - 58 (54 ± 3); G1 = 9 - 18; G2 = 12 - 19; odontostyle 27 - 28 um ; odontophore 24 - 27 um; oesophagus 340 - 412 (388 ± 25.5) um; basal expansion 168-215 um; prerectum 113-243 (182 ± 48) um; rectum 29 - 37 um; tail 25 - 33 (30.5 ± 2) um; ABD 34 - 41 (37.5 ± 3) um.

Description :

Female : Body medium-sized, about 1.4 - 1.8 mm long, cylindroid, tapering towards anterior end, ventrally arcuate upon fixation. Cuticle finely transversely striated. Subcuticle loose. Radial refractive elements abundant along the entire body. Lateral chords about one-half body width wide at midbody . Lateral body pores coarse, located in two rows but mostly near the dorsal line of the lateral chords. Lip region set off by deep constriction, cap-like, lips rounded, partially separate, peri-oral disc absent, labial and cephalic papillae slightly protruding. Amphids stirrup-shpaed, about one-half lip width wide, apertures slit-like. Stoma almost cylindrical. Odontostyle strongly sclerotized 1.6 - 1.8 lip widths long, slightly curved dorsally, lumen about 1.5 um wide, aperture about 3 um. Odontophore simple, rod-like, slightly less than odontostyle, base with pharyngeal bulging. Guiding ring single, located at about one lip width distance from anterior end. Nerve ring located at 112 - 132 um from anterior end. Anterior part of oesophagus a slender, weakly muscular structure. Basal expanded part about 52 - 56% of total oesophageal length. Cardia bluntly conoid, about one-third body width long.

Reproductive system amphidelphic, vulva longitudinal or pore-like, distally fimbriate. Vagina nearly spherical, about one-half body width deep. Uterus a narrow tube, sperms absent. Sphincter present at oviduct-uterus junction. Oocytes arranged in a single row except at tip. Prerectum about 3 - 6 anal body widths long. Rectum about one anal body width long or slightly less. Tail short, convex-conoid, about 0.8 - 0.9 anal body width long, inner cuticle irregular and retracted. Caudal pores 3 on each side. Terminal pore canal-like.

Male : Not found.

Type locality and habitat : Soil around roots of common weeds (***Tridax*** sp.) from Royarkoppal, Hassan Distt.

Type material : Collected in April 1993. Holotype female on slide ***Chitwoodius curvistylus*** n.sp./1 and paratype females on slides ***Chitwoodius curvistylus*** n.sp./2-4.

Relationship :*Chitwoodius curvistylus* n.sp. closely resembles *C. **brasiliensis*** Siddiqi, 1983 and *C. **seshadrii*** Baqri, 1980. From *C. **brasiliensis*** it differs in having shorter body, oesophagus, basal expansion, lesser c value, shorter odontostyle, odontophore and longer prerectum (L = 1.6 - 2.5 mm; oesophagus 460 - 550 um; basal expansion 45 - 50%; c = 52 - 59; odontostyle 31 - 37 um; odontophore 31 - 36 um; prerectum 100 - 120 um in *C. **brasiliensis***). Further, it can be differntiated from *C. **seshadrii*** in having longer tail, lesser c value, longer basal expanded part of oesophagus and in the absence of males (tail 23 - 27 um; c = 60 - 68; basal expansion 46 - 49% and males present in *C. **seshadrii***).

FAMILY LEPTONCHIDAE THORNE, 1935

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle and subcuticle finely transversely striated, rarely longitudinal striations forming lamelliform pattern on the cuticle; refractive elements and radial striae present, lateral pores usually arranged in two rows. Lip region generally set off, labial disc may be present around oral aperture. Amphids cyathiform, simple or duplex, often thick-walled. Stoma a long truncate cone. Odontostyle attenuated, slender, often solid, needle like. Odontophore rod-like, arcuate or provided with basal flanges. Anterior part of oesophagus a slender tubular structure ending in a small pyriform or cylindroid basal bulb, continuous or set off by constriction; inner cuticular lining of basal bulb may be thickened Cardia hemispheroid or elongated. Vulva transverse or longitudinal. Female reproductive system monodelphic or amphidelphic. Males with arcuate spicules, lateral guiding pieces and a few spaced ventromedian supplements Tails rounded or long filiform; similar in sexes.

Type subfamily :

Leptonchinae Thorne, 1935

Other subfamilies :

Belonenchinae Thorne, 1964

Tylencholaimellinae Jairajpuri, 1964

Tyleptinae Jairajpuri, 1964

Encholaiminae Golden and Murphy, 1967

Athernematinae Ahmad and Jairajpuri, 1978

SUBFAMILY LEPTONCHINAE THORNE, 1935

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle finely, transversely striated, usually with distinct radial refractive elements; subcuticle sometimes loose and coarsely striated. Lip region set off, labial disc may be present or absent. Stoma sclerotized. Odontostyle usually slender. Odontophore simple or arcuate, rarely flanged. Anterior part of oesophagus a slender tubular strcuture. Posterior basal bulb pyriform or cylindroid, set off by constriction or continuous. Female reproductive system monodelphic or amphidelphic. Vulva transverse or longitudinal. Males with dorylaimoid reproductive organs. Tails short, usually bluntly rounded; similar in sexes.

Type genus :

Leptonchus Cobb, 1920

Other genera :

Funaria Van der Linde, 1938

Proleptonchus Lordello, 1955

Bertzuckermania Khera, 1970

Meylis Goseco, Ferris and Ferris, 1974

Proleptonchoides Ferris, Goseco and Kumar, 1979

Apoleptonchus Siddiqi, 1982

Paraleptonchus N.Gen.

GENUS *PROLEPTONCHUS* LORDELLO, 1955

The genus ***Proleptonchus*** was established by Lordello (1955) to accommodate those specimens with distinctly cuticularised, flask-shaped stoma, slender, attenuated odontostyle, arcuate odontophore, expanded part of oesophagus a constricted bulb, mono-prodelphic gonad, hemispheroid to bluntly conoid tails in both sexes ***P. aestivus*** was proposed as its type species Several new proposals and synonymy were done for the species by various workers In the present course of study, soil samples collected from different localities of Malnad tracts yielded two known species of ***Proleptonchus*** which are reported here.

Diagnosis : (After Jairajpuri and Ahmad 1992) Body moderate-sized, cylindroid, slightly ventrally arcuate upon fixation Cuticle smooth or finely transversely striated, refractive elements abundant Subcuticle coarsely or finely striated, rarely loose, radial striae present Body pores in two rows Lip region set off by expansion, lips separate or amalgamated, truncate, papillae not raised Stoma sclerotized, flask-shaped Amphids cyathiform, simple or duplex, apertures slit-like, odontostyle very slender, attenuated, aperture barely visible, lumen very narrow. Odontophore weakly sclerotized, arcuate Anterior part of oesophagus very slender, terminating in a pyriform basal bulb, distinctly set of by constriction Cardia flat to bluntly conoid or rounded Vulva transverse, post-equatorial Female reproductive system mono-prodelphic, posterior branch reduced to a sac Prerectum junction with

intestine may be guarded by three small cells. Spicules dorylaimoid; lateral guiding pieces and spaced ventromedian supplements present. Tails hemispheroid to bluntly conoid; similar in sexes.

Type species :

Proleptonchus aestivus Lordello, 1955

Other species :

There are some 16 known species including the following additions :

Proleptonchus krugeri Botha and Heyns, 1992

P. dieteri Bruin and Heyns, 1992

P. fagi Guirado and Arcos, 1994

PROLEPTONCHUS AESTIVUS LORDELLO, 1955

Measurements :

Females (n = 8) : L = 1.1 - 1.4 (1.2 ± 0.1) mm; a = 38.2 - 44.9 (40 ± 2.5); b = 5.5 - 6.8 (6.2 ± 0.4); c = 49.4 - 86 (77.6 ± 10); c' = 0.7 - 1.2 (0.8 ± 0.2); V = 52 - 61 (56 ± 4); G1 = 15 - 26.5; G2 = 2.6 -7.4; odontostyle 7.5 - 9 um; odontophore 9 - 12 um; oesophagus 188 - 232 (200 ± 10) um; basal expansion 28 - 41 (34 ± 6) um; cardia 4 - 8 um; nerve ring 85 - 90 um; prerectum 110-178 (156±20) um; rectum 26.5-37 (34 ± 3.5) um; tail 13 - 22 (19 ± 5) um; ABD 19 - 25 (22 ± 2) um.

Male : Not found.

Habitat and locality : Collected from soil around roots of mango trees from CRS campus, Chikmagalur Distt.

Remarks : The present specimens conform well with ***P. aestivus*** Lordello,

1955 except in having slender body, longer oesophagus and shorter odontostyle (a = 32 - 35, oesophagus 182 um, odontostyle 6.4 um in the type material)

PROLEPTONCHUS CLARUS TIMM, 1964

Measurements :

Females (n = 5) : L = 1 3 - 2 0 (1 7 ± 0 3) mm, a = 34 9 - 41 1 (40 5 ± 2 0), b = 7 3-8 6 (7 7 ± 0 8), c = 82 6-104 4 (93 1 ± 11), c' = 0 7, V = 57 - 62 (59 ± 3), G1 = 14 - 25 (20 ± 5 5), G2 = 3 7 - 6.6 (5 2 ± 1 5), odontostyle 9 um, odontophore 9 - 11 um, oesophagus 188 - 234 (218 ± 25 5) um, basal expansion 37 - 43 (40 ± 3) um, cardia 6 - 8 um, nerve ring 90-110 um, prerectum 88-140 (122 5 ± 30) um, rectum 29-35 um, tail 16-19 (18±1 5) um,ABD 23 5 - 29 (27 ± 3) um

Males (n = 8) : L = 1 3 - 1 8 (1 6 ± 0 3) mm, a = 32.3 - 49 2 (40 3 ± 7 6), b = 6 1 - 8 (7 1 ± 1 0), c = 48 5 -80 5 (67 2 ± 14.6); c' = 0 8-1 1 (0 9 ± 0 1), T = 53 - 64 (58 ± 4 7), spicule 44 - 51 (47 ± 3) um; lateral guiding pieces 10 - 16 um, ventromedian supplements 6 - 7; odontostyle 9 - 10 um, odontophore 10 - 12 um, oesophagus 206 - 226 (220 ± 9) um, basal bulb 37 - 42 (40 ± 3) um, cardia 6 - 8 um, nerve ring 96 - 107 um, prerectum 176 - 272 (221 ± 42) um, rectum 37 - 48 um; tail 21 - 28 (23 5 ± 3) um, ABD 25 - 28 um

Habitat and locality : Soil around roots of pepper plants ***(Piper nigrum)*** from Samse Estate, Chikmagalur Distt

Remarks : The present specimens conform well with ***P.clarus*** Timm, 1964 except in having shorter prerectum and longer basal bulb of the oesophagus (prerectum 151 - 204 um, basal bulb 17 - 18% in ***P. clarus*** against 18 - 20%)

GENUS *PARALEPTONCHUS* N.GEN.

In the present course of study one of the soil samples collected from the Malnad yielded females of a leptonchid nematode which upon detailed study revealed to be a new genus for which the name ***Paraleptonchus convolusus*** n.gen.,n.sp. is proposed. The new genus closely resembles ***Proleptonchus*** Lordello, 1955 in having mono-prodelphic gonad, flask-shaped stoma and transverse vulva. It is characterized in having an highly convoluted anterior part of oesophagus without musculature.

Diagnosis : Small-sized nematodes, slightly ventrally curved upon fixation. Subcuticle loose, coarsely striated. Lateral body pores indistinct. Radial refractive elements not observed. Lip region set off by constriction. Stoma distinctly sclerotized, flask-shaped. Spear attenuated, aperture indistinct. Spear extension arcuate, weakly sclerotized. Anterior part of oesophagus unique, highly convoluted, musculature indistinct to absent. Posterior part of oesophagus with a pear-shaped structure which in turn joins the pyriform basal bulb. Junction of the pear-shaped structure and basal bulb constricted. Cardia small, rounded. Vulva transverse, not sclerotized. Reproductive system mono-prodelphic. Posterior uterine branch a simple sac. Prerectum long. Tail short, less than anal body width, bluntly rounded.

Type and only species :

Paraleptonchus convolusus n.sp.

Relationship : ***Paraleptonchus*** n.gen.closely resembles ***Proleptonchus*** Lordello, 1955 in the presence of a sclerotized, flask-shaped stoma,

mono-prodelphic gonad and bluntly rounded tail, but it distinctly differs from the latter in having uniquely convoluted anterior part of oesophagus without visible musculature and a pear-shaped structure anterior to the pyriform basal bulb (anterior part of oesophagus with usual musculature and not convoluted, pear-shaped structure not present anterior to the basal bulb in ***Proleptonchus***).

PARALEPTONCHUS CONVOLUSUS N.SP.

(Fig. 27)

Measurements :

Holotype female : L = 1.2 mm; a = 43.6; b 3.9; c = 78.5; c' = 0 7, V = 62, G1 = 21; G2 = 2.4; odontostyle 9 um; odontophore 9 um; oesophagus 296 um; basal bulb 30 um; prerectum 125 um; rectum 25 um, tail 15 um, ABD 21um.

Paratype female (n = 1) : L = 1.2 mm; a = 42.9; b = 3.8; c = 74 1; c' = 0.9, V = 63; G1 = 21; G2 = 1.8; odontostyle 9 um; odontophore 10 um, oesophagus 316 um; basal bulb 29 um; prerectum 120 um; rectum 24 um, tail 16 um; ABD 19 um.

Description :

Female : Body small, about 1.2 mm long, cylindroid, slightly ventrally arcuate upon fixation. Cuticle finely transversely striated Subcuticle loose, coarsely striated. Lateral chords about one-third body width wide at mid body. Lateral body pores indistinct. Radial refractive elements not observed Lip region set off by constriction, about 9-10 um wide, 3-4 um high, papillae distinct. Amphids stirrup-shaped, duplex, about three-fourths lip width wide Stoma flask-shaped, sclerotized. Odontostyle about one lip width long, attenuated lumen fine, aperture indistinct. Odonotophore arcuate, weakly sclerotized, about one odontostyle length long. Nerve ring at 87 - 88 um from

anterior end. Anterior part of oesophagus unique, highly convoluted, musculature almost absent. Posterior part with a pear-shaped structure which in turn joins with the basal pyriform bulb. Junction of pear-shaped structure and posterior pyriform bulb deeply constricted. Basal expansion about 10% of total oesophageal length. Cardia short, rounded, less than one-fourth corresponding body width long. Oesophageal gland nulcei and their orifices are located as follows :

DO	90 - 91	S_1N_1	93 - 93.2
DN	91 - 91.5	S_1N_2	93 - 93.3
DO - DN	0.6 - 0.7	S_2N	95 - 95.4
		S_2O	95 - 95.4

Female reproductive system mono-prodelphic. Vulva transverse, thick-walled, not sclerotized. Vagina triangular, about one-half corresponding body width deep. Anterior branch of the gonad well developed. Distinct sphincter present at oviduct-uterus junction. Uterus a simple sac-like structure without sperms. Oocytes arranged in a single row except near tip. Posterior uterine branch about 22 - 28 um, a simple sac. Prerectum about 6 anal body widths long. Tail short, less than anal body width long, bluntly rounded. Caudal papilla one on each side.

Male : Not found.

Type habitat and locality : Soil around roots of coconut trees from Hassan.

Type material : Collected in July 1993. Holotype female on slide ***Paraleptonchus convolusus*** n.gen., n.sp./1 and paratype female on slide ***Paraleptonchus convolusus*** n.gen., n.sp./2

GENUS *PROLEPTONCHOIDES* FERRIS, GOSECO AND KUMAR, 1979

Ferris, Goseco and Kumar (1979) established the genus ***Proleptonchoides*** with ***P. southindiae*** as its type species. Siddiqi (1995) added a new species from Cameroon. In the present study, several samples from the Malnad tracts of Karnataka yielded a new species of ***Proleptonchoides*** which has been described and illustrated.

Diagnosis : (Emended). Body moderate-sized, cylindroid, tapering towards extremities, slightly ventrally arcuate upon fixation. Cuticle finely transveresely striated. Subcuticle intact or loose, coarsely striated. Lateral chords about one-third body width wide, pores distinct or indistinct. Radial refractive elements abundant. Lip region set off by depression, truncate, angular, amalgamated, about one-third body width wide. Oral opening with weakly sclerotized refractive material. Stoma wider at base, sclerotized, guiding ring distinct. Amphids cup or bell-shaped, apertures may or may not be thick-walled. Spear attenuated, straight or slightly bent at tip, aperture barely visible, lumen fine. Odontophore distinctly flanged at base, one-half to one odontostyle length long. Anterior part of oesophagus a slender tube, joins with the posterior pyriform bulb, set off by constriction. Basal bulb about 19 - 22% of total oesophageal length. Cardia short, bluntly conoid or rounded. Nerve ring about half way along oesophagus. Vulva transverse, not sclerotized. Female reproductive system mono-prodelphic, posterior branch rudimentary. Prerectum about 8 - 11 anal body widths long. Tail digitate,

spicate, about 2 anal body widths long. Caudal papillae one on each side. Male not found.

Type species :

Proleptonchoides southindiae Ferris, Goseco and Kumar, 1979

Other species :

P. precei Siddiqi, 1995

P. equistylus n.sp.

PROLEPTONCHOIDES EQUISTYLUS N.SP.

(Fig. 27)

Measurements :

Holotype female : L = 1.0 mm; a = 35 - 1; b = 5.2; c = 30.5; c' = 1.8; V = 58; G1=20; odontostyle 10 um; odontophore 11 um; oesophagus 199 um; basal bulb 41 um; prerectum 170 um; rectum 24 um; tail 34 um; ABD 19 um.

Paratype females (n = 9) : L = 1.0 - 1.1 mm; a =34 - 37.5 (36 ± 1.2); b = 5.2 - 6.0 (5.7 ± 0.3); c = 26 - 33 (30 ± 2.8); c' = 1.6 - 2.1 (1.8 ± 0.2); V = 57 - 61 (59 ± 2); G1 = 16 - 25 (21 ± 5); odontostyle 10 - 11 um; odontophore 10 - 11 um; oesophagus 168 - 199 (181 ± 11) um; basal bulb 35 - 41 (38 ± 2) um; prerectum 162 - 213 (180 - 20) um; rectum 19 - 25 um; tail 32 - 38 (35 ± 1 2.5) um; ABD 18 - 20 um.

Description :

Female : Body about 1 mm long, cylindroid, tapering towards extremities, slightly ventrally arcuate upon fixation. Cuticle finely transversely striated. Subcuticle intact, coarsely striated. Lateral chords about one-third body

width wide, lateral pores indistinct, radial refractive elements abundant Lip region set off by depression, angular, tip looks flat, amalgamated, about one-third body width wide Oral opening lined with weakly sclerotized refractive material Stoma about 9 um long, sclerotized, bottle-shaped Guiding ring distinct Amphids inverted bell-shaped, apertures wider than fovea, thick-walled, duplex Odontostyle attenuated, bent dorsally at tip, aperture indistinct, lumen fine, visible only at base Odontophore distinctly flanged, as long as odontostyle length Nerve ring at 45 - 48% of oesophageal length Anterior part of oesophagus slender, tubular, ends in a pyriform basal bulb, set off by constriction Basal bulb about 20 - 22% total oesophageal length Cardia small, rounded, about one-fifth corresponding body width long

Female reproductive system mono-prodelphic Vulva transverse, not sclerotized Vagina inclined anteriad, about one-half body width deep, walls faintly sclerotized Anterior branch well developed Uterus about 3 body widths long, sac-like, without sperms Distinct sphincter present at oviduct-uterus junction Oocytes arranged in single line except at tip Posterior branch rudimentary, about 6-8 um long Eggs measure 88 - 90 um long, 27 um wide, cylindroid Prerectum 9 - 11 anal body widths long Rectum 1 1 - 1 2 anal body widths long Tail short, cylindroid then abruptly spicate, 1 6 - 2 1 anal body widths long Caudal papillae indistinct

Male : Not found

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) and grasses (unidentified) from Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Proleptonchoides equistylus*** n.sp./1 and paratype females on slides ***Proleptonchoides equistylus*** n.sp./2-4.

Relationship : ***Proleptonchoides equistylus*** n.sp. closely resembles ***P. southindiae*** Ferris, Goseco and Kumar, 1979 and ***P. precei*** Siddiqi, 1995. It differs from ***P. southindiae*** in having equally developed odontostyle and odontophore, in odontostyle shape, amalgamated lip region, intact subcuticle, longer oesophagus, more c value and longer prerectum (odontostyle and odontophore 11 - 14 um and 6 - 8 um respectively; odontostyle straight; liplets distinct; subcuticle loose; oesophagus 163 - 177 um; c = 25.6 - 30; prerectum 128 - 160 um in ***P. southindiae***). From ***P. precei*** it differs in having longer body, greater a, b, c and V ratios, lesser c', shorter odontostyle and odontophore, shorter expanded part of oesophagus and prerectum (L = 0.7 - 0.75 mm; a = 29 - 30.2; b = 4.3 - 5.4; c = 20.4 -25.5; c' = 2 - 2.4; V = 54.3 - 55; odontostyle 13 - 13.5 um; odontophore 12.5 - 13.5 um; expanded part of oesophagus 28 - 33 um and prerectum 2 body widths long in ***P. precei***).

SUBFAMILY TYLEPTINAE JAIRAJPURI, 1964

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle finely or coarsely striated. Lip region set off, lips prominently projecting. Stoma small, weakly sclerotized. Amphids cup or stirrup-shaped. Odontostyle robust or attenuated; lumen wide or fine, aperture distinct. Odontophore straight or slightly arcuate, often flanged. Oesophageal bulb pyriform or elongate-saccate, valvular chamber thickened. Female reproductive system mono-opisthodelphic. Males with dorylaimoid reproductive structures. Tails short, bluntly rounded or hemispheroid; similar in sexes.

Type genus :

Tyleptus Thorne, 1939

Other genera :

Caveonchus Siddiqi, 1982

Gymnotyleptus Ahmad and Jairajpuri, 1982

Remarks : Jairajpuri and Ahmad, 1992 placed the genus ***Caveonchus*** rather doubtfully owing to its resemblance to the genera of Belonenchinae. They also suggested that ***Tyleptus*** and ***Basirotyleptus*** may be placed in Tyleptinae. In the present study the placement of ***Caveonchus*** under Tyleptinae is accepted. ***Basirotyleptus*** is well placed under Belonenchinae rather than Tylptinae.

GENUS *TYLEPTUS* THORNE, 1939

The genus ***Tyleptus*** was established by Thorne, 1939 with ***T. projectus*** as its type species. He (l.c.) characterized the genus with cuticular refractive

elements, raised inner liplets, triquetrous, valvular chamber of oesophagus and a single gonad in females. Various workers have suggested different systematic position for this genus. Goseco, Ferris and Ferris (1974) recognised 8 species under this genus. Ahmad and Jairajpuri (1982) separated those species of ***Tyleptus*** without inner liplets around oral aperture and indistinct valvular chamber in the oesophageal bulb and erected a new genus ***Gymnotyleptus***. Jairajpuri and Ahmad (1992) recognised only 7 species under ***Tyleptus***. In the present study, one known and a new species of ***Tyleptus*** collected from Malnad tracts are described and illustrated.

Diagnosis : (Emended). Body cylindorid, straight to slightly ventrally arcuate upon fixation. Cuticle smooth or finely striated; subcuticle finely striated or smooth. Body pores in two rows. Lip region set off, liplets around oral aperture distinct. Amphids cup or stirrup-shaped, simple or duplex. Stoma weakly sclerotized, short, truncate, cone-like. Odontostyle robust, dorsal arm often irregular. Odontophore simple, rod-like or flanged at the base. Oesophagus slender, ending in a short pyriform basal bulb; vulvular chamber thickened. Cardia small, rounded. Vulva transverse. Female reproductive system mono-opisthodelphic. Spicules dorylaimoid; lateral guiding pieces and few ventromedian supplements present. Tails short, hemispheroid, rounded or bluntly conoid; similar in sexes.

Type species :

Tyleptus projectus Thorne, 1939

Other species :

T. affinis Thorne, 1970

T. amalgans Thorne, 1964

T. oryzae n.sp.

T. parvus Jairajpuri, 1965

T. striatus Heyns, 1963

T. tyleptus Andrássy, 1969

T. variablis Jairajpuri and Loof, 1966

TYLEPTUS STRIATUS HEYNS, 1963

Measurements :

Female (n = 1) : L = 0.7 mm; a = 32; b = 3.8; c = 45; c' = 0.9; V = 34; G1 = 6.1; G2 = 31; odontostyle 7.5 um; odontophore 9 um; guiding ring 5 um; oesophagus 190 um; basal bulb 31 um; nerve ring 75 um; cardia 4 um; prerectum 59 um; rectum 16 um; tail 16 um; ABD 18 um.

Male (n = 1) : L = 0.8 mm; a = 35.5 ; b = 3.8; c = 45.5; c' = 1.0; T = 62; spicule 27 um; lateral guiding pieces 12 um; ventromedian supplements 3; odontostyle 7.5 um; odontophore 7.5 um; guiding ring 4.5 um; oesophagus 222 um; basal bulb 30 um; nerve ring 79 um; cardia 4 um; prerectum 96 um; rectum 22 um; tail 18 um; ABD 18 um.

Habitat and locality : Soil around roots of paddy (*Oryza sativa*) from N.R. Pura.

Remarks : The present specimens conform well with *T. striatus* Heyns, 1963 except in having lesser c value in females (c = 63 -71 in the type material).

TYLEPTUS ORYZAE N.SP.

(Fig. 28)

Measurements :

Holotype female : L = 1 1 mm; a = 35.9; b = 4 8; c = 107 6, c' = 0 6, V = 33, G1 = 1.3, G2 = 30.5; odontostyle 7 5 um, odontophore 9 um, oesophagus 231 um; basal bulb 32 um; prerectum 200 um, rectum 30 um, tail 10 um; ABD 18 um.

Paratype females (n = 7) : L = 1-1.1 mm; a = 33 3 - 35 9 (34 4 ± 1 3), b = 4.1 - 4.9 (4.5 ± 0.3); c = 69.1 - 107.6 (80 ± 16); c' = 0.6 - 0 8; V = 32 - 34; G1 = 1.4 - 6.5 (3.5 ± 2 4); G2 = 31 - 38 (34 ± 3); odontostyle 6 - 7.5 um; odontophore 7.5 - 9 um; oesophagus 222 - 259 (236 ± 14) um, basal bulb 32 - 47 (35 ± 4.5 um; prerectum 81 - 200 (118 ± 51) um, rectum 28 - 31 um; tail 10 - 15 (13.5 ± 1.9) um; ABD 18 - 19 um.

Paratype males (n = 2) : L = 0.9 - 1.1 mm; a = 30 - 41, b = 4 4 - 4 7, c = 55 5 - 58; c' = 0.8 - 0.9; T = 59 - 69; spicule 29 - 31 um; lateral guiding pieces 9 - 10 um, ventromedian supplements 3; odontostyle 7 5 - 8 um, odontophore 7.5 - 8 um; oesophagus 212 - 225 um; basal bulb 29 - 30 um, prerectum 199 - 208 um; rectum 40 - 44 um; tail 16 - 19 um, ABD 20 - 21 um.

Description :

Female : Body about 1 mm or slightly more, ventrally arcuate or straight upon fixation, subcylindrical. Cuticle smooth, subcuticle loose, coarsely striated Lateral field about one-half body width wide at midbody, glandular Refractive radial striae not observed. Lateral body pores indistinct.

Lip region set off by depression, lips separate, papillae raised Amphids wide, about three-fourths lip width wide, bilobed, duplex Guiding ring single, located at 4 - 5 um from anterior end. Odontostyle about 6 - 8 um long, dorsal arm irregular in shape, aperture and lumen wide Odontophore slightly longer than odontostyle, widened at base, in lateral view appears to be flanged. Anterior part of oesophagus a slender tube terminating in a pyriform or oval basal bulb with valvular thickening. Junction of anterior and posterior part of oesophagus not constricted. Basal bulb occupying about 13 - 18% of total oesophageal length. Nerve ring at 79 - 84 um from anterior end Cardia small, about 4 - 6 um long, rounded.

Female reproductive system mono-opisthodelphic Vulva transverse, opening a wide slit, thick walled. Vagina about one-half body width deep Anterior uterine-sac very long, some times as long as upto oesophageal base, filled with spindle-shaped sperms. Posterior gonad well developed Uterus a long tubular structure. Distinct sphincter present at oviduct-uterus junction Proximal part of oviduct bulged, glandular. Oocytes arranged in single row except at tip Prerectum about 4 - 11 anal body widths long Rectum longer than anal body diameter. Tail short, bluntly rounded, less than one anal body width long. Candal papillae two on each side. Protoplasmic core on the tail portion leaving an irregular chamber.

Male : Similar to females; tail portion more arcuate and bluntly conoid Testes dorylaimoid, spicules simple, rod-like, arcuate, about 29 - 30 um long medially. Lateral guiding pieces about one-third spicular length Ventromedian

supplements 3, widely spaced and an adanal pair, extend beyond prerectum range. Tail about 0.8-0.9 anal body width long. Caudal papillae two on each side.

Type habitat and locality : Soil around roots paddy (***Oryza sativa***) and grasses (unidentified) near Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Tyleptus oryzae***. n.sp./1 and paratype females and males on slides ***Tyleptus oryzae*** n.sp./2-4.

Relationship : ***Tyleptus oryzae*** n.sp. is distinguished by the presence of long anterior uterine sac and prerectum. It comes closer to ***T. striatus*** Heyns, 1963 and ***T. variablis*** Jairajpuri and Loof, 1966. From ***T. striatus***, it differs in having longer body, spicules, shorter tail, lesser a, c and more c' values (L = 0.75 - 1.0 mm; a = 27 - 42; tail = 23 um; c = 40 - 71; c' = 1.2; spicule 25 - 28 um in ***T. striatus***). Further, from ***T. variablis***, it can be differentiated in the absence of radial refractive striae, longer anterior uterine branch, shorter spicules, longer lateral guiding pieces, odontostyle, basal bulb, rectum and prerectum (radial retractive striae present; G1 = 1.1 - 1.9; spicules 34 - 35 um; lateral guiding pieces 7 um; odontostyle 8.5 um; basal bulb 30 um; rectum 17 um; prerectum 80 um in ***T. variablis***).

SUBFAMILY BELONENCHINAE THORNE, 1964

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle and subcuticle finely striated. Radial refractive elements may be present or absent Lip region set off, labial disc may be present around oral aperture Stoma sclerotized, long, truncate-conoid or goblet-shaped Amphids with cup or stirrup-shaped fovea. Odontostyle solid, attenuated, lumen indistinct Odontophore rod -like, flanged or enveloped by distinct pharyngeal tissue, often arcuate. Basal bulb of oesophagus pyriform or elongate-saccate, valvular thickening present. Female reproductive system monodelphic or amphidelphic. Tails short, bluntly rounded or conoid; similar in sexes

Type genus :

Basirotyleptus Jairajpuri, 1964

Other genera :

Sclerostylus Goseco, Ferris and Ferris, 1981

Glochidorella Siddiqi, 1982

Zetalaimus Siddiqi, 1983

Punctoleptus Khan, 1987

GENUS *BASIROTYLEPTUS* JAIRAJPURI, 1964

Jairajpuri (1964) established the genus ***Basirotyleptus*** with ***B. basiri*** as its type species. He characterised it by a solid-appearing, needle-like spear and pyriform oesophageal bulb. The genus ***Trichonchium*** Siddiqi and Khan (1964) was synonymised with ***Basirotyleptus*** by Siddiqi and Khan in 1965

Thorne's (1964) genera, viz., ***Poncenema*** and ***Belonenchus*** were synonymised by Siddiqi (1969). Jairajpuri and Ahmad (1992) proposed 5 subgenera under ***Basirotyleptus*** namely ***Basirotyleptus*** Jairajpuri, 1964 ***Trichonchium*** Siddiqi and Khan 1964; ***Coronatyleptus*** Siddiqi, 1982; ***Aculonchus*** Siddiqi, 1983 and a new subgenus ***Opisthotyleptus.***

Siddiqi (1995) while describing 5 new species of the genus ***Basirotyleptus*** apparently did not seem to agree with the proposal of subgenera by Jairajpuri and Ahmad (1992), because in his paper he has described all species under the genus ***Basirotyleptus***. In the present study, it is felt that Jairajpuri and Ahmad's (1992) proposal is reasonable, because all the subgenera show distinct characters and hence the same has been followed. Four of Siddiqi's (1995) new species were kept under the subgenus ***Basirotyleptus*** while one of them is shifted to ***Coronatyleptus*** based on the nature of labial disc.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body cylindroid, usually ventrally arcuate. Cuticle and subcuticle finely striated. Radial retractive striae and elements present or absent. Body pores apparently in two rows. Lip region set off, lips and papillae distinct. Amphids cup or stirrup-shaped, simple or duplex. Stoma a long, truncate cone, sclerotized, thickened around oral aperture. Odontostyle solid, attenuated. Odontophore simple, rod-like, flanged or enveloped by oesophageal tissue. Anterior part of oesophagus slender, tubular, terminating in pyriform basal bulb. Inner cuticular lining of basal bulb distinct. Cardia small, rounded. Vulva transverse. Female reproductive system monodelphic or amphidelphic. Spicules dorylaimoid,

lateral guiding pieces present. Supplements 1 - 4, spaced and an adanal pair. Tails short, conoid or hemispheroid, similar in sexes.

Type subgenus :

Basirotyleptus (Jairajpuri, 1964) Jairajpuri and Ahmad, 1992

Other subgenera :

Trichonchium (Siddiqi and Khan, 1964) Jairajpuri and Ahmad, 1992

Coronatyleptus (Siddiqi, 1982) Jairajpuri and Ahmad, 1992

Aculonchus (Siddiqi, 1982) Jairajpuri and Ahmad, 1992

Opisthotyleptus Jairajpuri and Ahmad, 1992

SUBGENUS *BASIROTYLEPTUS* (JAIRAJPURI, 1964) JAIRAJPURI AND AHMAD, 1992

Jairajpuri and Ahmad (1992) characterized the subgenus ***Basirotyleptus*** by its offset lip region, needle-like odontostyle, sclerotized odontophore and mono-opisthodelphic reproductive system. The subgenus has 9 species incluing the type species ***B. (B.) basiri*** Jairajpuri, 1964. The 4 species described by Siddiqi (1995) are transferred to the subgenus ***Basirotyleptus***. The type species, ***B.(B.) basiri*** Jairajpuri (1964) collected during the course of study is reported here.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle and subcuticle transversely striated. Radial refractive elements and striae present Lip region set off, lips and papillae distinct. Amphids simple or duplex. Stoma a long truncate cone, sclerotized. Odontostyle attenuated; odontophore sclerotized, enclosed in distinct oesophageal tissue. Female reproductive

system mono-opisthodelphic. Anterior uterine branch a short sac or absent. Males with dorylaimoid structures. Tails short, bluntly rounded or conoid; similar in sexes.

Type species :

Basirotyleptus (Basirotyleptus) basiri Jairajpuri, 1964

Other species :

B. (B.) acus Goseco, Ferris and Ferris, 1974

B. (B.) caudatus Jairajpuri, 1966

B. (B.) minuts Khan, 1987

B. (B.) minimus Jana and Baqri, 1981

B. (B.) penetrans (Thorne, 1964) Siddiqi, 1969

B. (B.) pini Siddiqi and Khan, 1964

B. (B.) soueastus Ahmad and Jairajpuri, 1980

B. (B.) striatus (Thorne, 1964) Siddiqi, 1969

B. (B.) upicus Ahmad and Jairajpuri, 1980

B. (B.) syncheilus (Siddiqi, 1995) n. comb.

B. (B.) siremps (Siddiqi, 1995) n. comb.

B. (B.) deminutus (Siddiqi, 1995) n. comb.

B. (B.) longisaccus (Siddiqi, 1995) n. comb.

BASIROTYLEPTUS (BASIROTYLEPTUS) BASIRI JAIRAJPURI, 1964

Measurements :

Female (n = 7) : L = 0.6 - 0.7 mm; a = 26.3-31.2 (28.5 ± 1.8); b = 5.4 - 6.7 (5.7 ± 0.6); c = 49.4 - 57.8 (53.2 ± 3.3); c' = 0.6 - 0.7; V = 34 - 39;

G1 = 2.5 - 3.5; G2 = 18 - 32; odontostyle 10 um; odontophore 7.5 - 9 um, guiding ring 7.5 - 9 um; oesophagus 97 - 107 (103 ± 5) um; basal bulb 16-17 um; nerve ring 59 - 66 um; cardia 3 um; prerectum 37 - 59 (47 ± 8) um, rectum 16-22 um; tail 10 - 12 um; ABD 15 - 19 um.

Male : Not found.

Habitat and locality : Soil around roots of banana trees (***Musa paradisiaca***) from Santavery Estate, Chikmagalur Distt.

Remarks : The present specimen conforms well with the original description of ***B. (B.) basiri*** Jairajpuri, 1964 except in having shorter odontostyle, odontophore and in the absence of males (odontostyle 11 - 12 um; odontophore 11 um and males present in the type material).

SUBGENUS *CORONATYLEPTUS* (SIDDIQI, 1982) JAIRAJPURI AND AHMAD, 1992

Siddiqi's (1982) genus ***Coronatyleptus*** was reduced to a subgeneric rank by Jairajpuri and Ahmad (1992) under the genus ***Basirotyleptus*** Jairajpuri, 1964, because they had felt that the labial disc is a distinct character but not of generic rank. Their view is accepted in the present study and hence Siddiqi's (1995) ***Basirotyleptus discinus*** is shifted to the subgenus ***Coronatyleptus. Basirotyleptus (Cornatyleptus) coronatus*** Siddiqi and Khan, 1965 was proposed as its type species and all the species with labial disc were transferred to this subgenus by Jairajpuri and Ahmad (1992). Soil samples collected from the Malnad tracts yielded a new species of the subgenus ***Coronatyleptus*** is described and illustrated.

Diagnosis : (After Ahmad and Jairajpuri, 1992). Cuticle and subcuticle transversely striated. Radial refractive striae and elements present. Lip region set off, labial disc present. Stoma a truncate cone or goblet-shaped, sclerotized. Odontostyle attenuated, solid, odontophore weakly sclerotized. Female reproductive system mono-opisthodelphic. Anterior uterine sac present or absent. Tails short, bluntly rounded or conoid; similar in sexes.

Type species :

Basirotyleptus (Cornatyleptus) coronatus Siddiqi and Khan, 1965

Other species :

B. (C.) barbare (Siddiqi, 1982) Jairajpuri and Ahmad, 1992

B. (C.) curvus (Siddiqi, 1982) Jairajpuri and Ahmad, 1992

B. (C.) ethiopicus Siddiqi, 1970

B. (C.) modestus Husain and Khan, 1968

B. (C.) neomoralis Siddiqi, 1970

B. (C.) discinus (Siddiqi, 1995) n. comb.

B. (C.) indicus n.sp.

BASIROTYLEPTUS (CORONATYLEPTUS) INDICUS N.SP.

(Fig. 29)

Measurements :

Holotype female : L = 0.7mm; a = 28.2; b = 4.3; c = 53.4; c' = 0.8; V = 43; G2 = 17.7; odontostyle 7.5 um; odontophore, 10 um; oesophagus 163 um; basal bulb 38 um; prerectum 104 um; rectum 22 um; tail 13 um; ABD 18 um.

Paratype females (n = 12) : L = 0.7 - 0.8 mm; a = 28.3 - 30.4 (29.2 ± 0 8); b = 4.3 - 5.3 (4.7 ± 0.4); c = 53.4 - 68.1 (63.3 ± 6.7); c' = 0.6 - 0.8 (0.7 ± 0.1); V = 43 - 45; G2 = 14 - 25; odontostyle 7.5 - 9 um; odontophore 10 um; oesophagus 156 - 163 (160 ± 2) um; prerectum 73 - 96 (83 ± 11) um; rectum 22 - 27 um; tail 10 - 12.5 um; ABD 17 - 19 um.

Description :

Female : Body cylindroid, slightly ventrally arcuate. Cuticle finely transversely striated; subcuticle coarsely striated, loose. Radial refractive elements absent. Lateral chords about one-third body width wide at midbody; body pores distinct, apparently in two rows. Lip region set off, papillae raised, about 9 um wide, 3 um high, labial disc present. Amphids

cyathiform, duplex, apertures bilobed, wide, slit-like. Stoma a truncate cone, sclerotized, thickened around oral opening. Odontostyle slender, attenuated, appearing solid, about one lip width long or slightly less. odontophore slightly arcuate, longer than odontophore, weakly sclerotized. Nerve ring at 71-75 um from anterior end. Anterior part of oesophagus slender, tubular, terminating in a pear-shaped basal bulb. Basal bulb about 22 - 24% of total oesophageal length, inner cuticular lining thickened, especially at the base. Cardia small, about 3 - 6 um long. DO - DN almost at same level.

Female reproductive system mono-opisthodelphic. Vulva pre-equatorial , transverse, opening a wide slit, thick walled. Vaginal walls sclerotized , vagina about one-half corresponding body width deep. Anterior uterine branch rudimentary, about 8 - 10 um long. Posterior branch well developed. Uterus without sperms. Distinct spincter present at oviduct-uterus junction. Ovary often reflexed back up to vagina. Prerectum about 4 - 5.4 anal body widths long. Rectum more than anal body width long. Tail short, about 0.6 - 0.8 anal body width long, hemispheroid. Caudal papillae prominent, two on each side.

Male : Not found.

Type habitat and locality : Soil around roots of pepper plants (***Piper nigrum***) from Suntikoppa Estate, Kodagu Distt.

Type material : Collected in May, 1993. Holotype female on slide ***Basirotyleptus (Coronatyleptus) indicus*** n.sp./1 and paratype females on slides ***Basirotyleptus (Cornatyleptus) indicus*** n.sp./2-4.

Relationship : ***Basirotyleptus (Coronatyleptus) indicus*** n.sp. comes closer to ***B. (C.) ethiopicus*** Siddiqi, 1970; ***B. (C.) neomoralis*** Siddiqi, 1970 and ***B. (C.) coronatus*** Siddiqi and Khan, 1965. From ***B. (C.) ethiopicus*** it differs in having longer body, oesophagus, tail, anal body diameter, lip width, basal bulb, and other body ratios (L = 0.46 0.5 mm; oesophagus 102 - 115 um; tail 6.4 - 10 um; ABD 13 um; lip region 5 - 6 um; basal bulb 14 - 19 um; prerectum 33 - 48 um; a = 18 - 24; c = 6.4 - 10 in ***B (C.) ethiopicus***). Further, it is different from ***B. (C.) neomoralis*** in having longer body; oesophagus; tail; anteriorly located vulva and lesser a value (L = 0.54 mm; oesophagus 112 um; tail 8 um; prerectum 28 um; V = 47; a = 33.7 in ***B. (C.) neomoralis).*** It also differs from ***B. (C.) coronatus*** in having longer oesophagus; lesser c value, shorter prerectum and in the absence of radial refractive elements (oesophagus 147 um; c = 74 - 100; prerectum 48 um and radial refractive elements abundant in ***B. (C.) coronatus***).

SUBFAMILY TYLENCHOLAIMELLINAE JAIRAJPURI, 1964

Diagnosis : (After Jairajpuri and Ahmad, 1992) Cuticle and subcuticle finely striated. Lip region set off or continuous. Labial disc present or absent. Odontostyle dorylaimoid, small; dorsal or ventral stiffening pieces may be present. Odontophore with distinct knobs or flanges at base. Oesophagus with small basal bulb, junction of anterior and posterior part set off by constriction. Vulva transverse. Female reproductive system monodelphic or amphidelphic. Males with dorylaimoid reproductive structures. Tails short, conoid or hemispheroid to long, filiform; similar in sexes.

Type genus :

Tylencholaimellus Cobb in M.V. Cobb, 1915

Other genera :

Doryllium Cobb, 1920

Dorella Jairajpuri, 1964

Phellonema Thorne, 1964

Agmodorus Thorne, 1964

Oostenbrinkiella Jairajpuri, 1965

Gerthus Goseco, Ferris and Ferris, 1975

Goferus Jairajpuri and Ahmad, 1992

GENUS *TYLENCHOLAIMELLUS* COBB IN M.V. COBB, 1915

Cobb in M.V. Cobb, (1915) established the genus *Tylencholaimellus* to accommodate those species which had dorsal accessory piece on the spear, spear extension with knobs or flanges and mono-ophisthodelphic gonad.

T. diplodorus was proposed as its type species. Several workers have discussed the systematic position of this genus and have also added species to it. Jairajpuri and Ahmad (1992), based on the presence or absence of labial disc, divided the genus into two subgenera, viz., *Tylencholaimellus* and *Coronatylencholaimellus*. In the present study, Jairajpuri and Ahmad's (1992) proposal of subgenera for the genus *Tylencholaimellus* is accepted and has been followed. It is felt that the proposal of subgenera enables grouping of species under definite categories without causing any complications.

Diagnosis : (Emended). Body slender, robust or somewhat obese, about 0.35 - 1.5 mm long. Cuticle and subcuticle with transverse striations. Lip region set off, often with labial disc. Odontostyle with dorsal stiffening pieces. Odontophore with knobs or flanges. Basal oesophageal bulb set off by constriction. Female reproductive system mono-opisthodelphic. Anterior uterine sac present or absent. Males with dorylaimoid gonads, ventromedian supplements few (1or 2). Tails short, rounded or conoid; similar in sexes.

Type subgenus :

Tylencholaimellus (Cobb in M.V. Cobb, 1915) Jairajpuri and Ahmad, 1992

Other subgenus :

Coronatylencholaimellus Jairajpuri and Ahmad, 1992

SUBGENUS *CORONATYLENCHOLAIMELLUS* JAIRAJPURI AND AHMAD, 1992

Species of ***Tylencholaimellus*** with a labial disc were placed under the subgenus ***Coronatylencholaimellus*** by Jairajpuri and Ahmad (1992). They (l.c.) made ***Tylencholaimellus (Coronatylencholaimellus) cornonatus*** Thorne, 1939 as its type species and recognised 8 species under it. In the present study it is felt that the species ***T. (C.) fenensis*** Yeates, 1970 and ***T. (C.) insertus*** Colomba and Vinciguerra, 1979 also should have been considered under ***Coronatylencholaimellus*** since these species also have labial disc.During the course of study, soil samples collected from Malnad tracts yielded a new species which is being described and illustrated.

Diagnosis : (Emended). Body cylindroid, ventrally arcuate. Cuticle and subcuticle with transverse striations. Radial refractive elements present or absent. Lip region set off or continuous. Labial disc prominent. Basal bulb of oesophagus usually cylindrical or pyriform, set off by constriction. Odontostyle with distinct dorsal stiffening. Odontophore usually shorter than odontostyle, distinctly flanged or knobbed. Guiding ring apparently absent. Amphids stirrup or cyathiform, apertures slit-like or thick-walled. Female reproductive system mono-opisthodelphic, anterior uterine sac present. Males with dorylaimoid spicules, lateral guiding pieces present or absent and 1 or 2 ventromedian supplements. Tails short, rounded or bluntly conoid; similar in sexes.

Type species :

Tylencholaimellus (Coronatylencholaimellus) coronatus Thorne, 1939

Other species :

T. (C.) amphidius n.sp.

T. (C.) diadematus Orr and Dickerson, 1965

T. (C.) fenensis Yeates, 1970

T. (C.) geraldi Ali, Farooqui and Suryawanshi, 1970

T. (C.) insertus Colomba and Vinciguerra, 1979

T. (C.) modulus Siddiqi and Husain, 1968

T. (C.) montanus Thorne, 1939

T. (C.) ozarkensis Goseco, Ferris and Ferris, 1975

T. (C.) projectus Siddiqi, 1964

T. (C.) sagerus Khan and Laha, 1983

T. (C.) sayeedi Siddiqi, 1965

T. (C.) striatus Thorne, 1939

CORONATYLENCHOLAIMELLUS AMPHIDIUS N.SP.

(Fig. 30)

Measurements :

Holotype female : L = 0.8 mm; a = 28.6; b = 5.4; c = 35.5; c' = 1.0; V = 32.6; G1 = 9.1; G2 = 32.1; odontostyle 15 um; odontophore 7 um; *oesophagus 140 um; basal bulb 30 um; prerectum 54 um; rectum 22 um;* tail 21 um; ABD 22 um.

Paratype females (n = 7) : L = 0.7 - 0.8 mm; a = 27.6 - 33.8 (30.3 ± 2.1); b = 4.4 - 5.5 (5.1 ± 0.4); c = 31.5 - 46.6 (37.8 ± 5.0); c' = 0.8 - 1.2 (1 ± 0.1); V = 31 - 35; G1 = 4.9 - 9; G2 = 22 - 32; odontostyle 14 - 15 um;

odontophore 6 - 7.5 um; oesophagus 143 - 165 (154 ± 8) um, basal bulb 31 - 32 um; prerectum 56 - 96 (67 ± 14) um; rectum 18 - 24 um; tail 16 - 26 (21 ± 3) um; ABD 18 - 24 um.

Paratype males (n = 5) : L =0.7 mm; a = 28 - 31 (29.8 ± 1.9); b = 4.4 - 5 1 (4 7 ± 0 3); c = 29.2 - 36.5 (21.6 ± 2.3); c' = 1 - 1.3, T = 50.5 - 56, spicules 25 - 28 um; ventromedian supplement 1; odontostyle 14 - 15 um; odontophore 6 - 7 um; oesophagus 140 - 160 (150 ± 10) um; basal bulb 30 - 31 um, prerectum 44-103 (81±32) um; rectum 23-32 um; tail 19-26 (22.8 ± 3 3) um, ABD 18 - 19 um.

Description :

Female : Body cylindroid, straight to slightly ventrally curved upon fixation Cuticle finely transversely striated. Radial refractive elements abundant Lateral chords about one-fourth body width wide at midbody. Lip region set off by depression. Oral disc not sclerotized. Amphids inverted bell-shaped or cyathiform with angular and thick-walled apertures, seen as thickenings at the base of lip region in the lateral view. Odontostyle typical of the genus, with distinct dorsal stiffening , 14 - 15 um long. Odontophore about one-half odontostyle length long with distinct basal knobs. Guiding ring apparently absent. Nerve ring situated at 76 - 88 um from anterior end. Anterior part of oesphagus a slender tubular structure ending in a pyriform basal bulb Anterior and posterior oesophagus set off by slight constriction. Basal expansion about 20 - 23% of toal oesophageal length. Cardia very small, dome-shaped, about 2 - 5 um long.

Female reproductive system mono-opisthodelphic. Vulva transverse, pre-equatorial, opening wide with thick walls. Vaginal walls sclerotized, vagina about one-half body width leep. Anterior uterine branch a moderately long sac, filled with spindle-shaped sperms. Posterior gonad normally developed. Oocytes arranged in a single line except at tip. Oviduct-uterus junction with indistinct sphincter. Eggs 78 um long 18 - 22 um wide. Prerectum about 2.3 - 5.2 anal body widths long. Rectum about one anal body width long. Tail short, bluntly rounded, about 0.8 - 1.1 anal body widths long, cuticle at tip thick. Caudal pores two on each side.

Male : Similar to females. Tail region more curved than females and somewhat bluntly conoid. Testes dorylaimoid. Spicules thin, arcuate, about 25 - 28 um medially, lateral pieces not visible. Supplements just an adanal pair and a ventromedian. Prerectum well above the ventromedian supplement. Rectum longer than anal body diameter. Tail short, bluntly rounded or conoid, about 1 - 1.3 anal body widths long.

Type habitat and locality : Soil around roots of grasses (unidentified) and paddy (***Oryza sativa***) from Muthinakoppa.

Type material : Collected in March, 1993. Holotype female on slide ***Tylencholaimellus (Coronatylencholaimellus) amphidius*** n.sp./1 and paratyle females and males on slides ***Tylencholaimellus (Coronatylencholaimellus) amphidius*** n.sp./2-4.

Relationship : ***Tylencholaimellus (Coronatylencholaimellus) amphidius*** n.sp. is unique in having bell-shaped amphids with angular and thick-walled apertures. It comes closer to ***T. (C.) fenensis*** Yeates, 1970

and *T. (C.) coronatus* Thorne, 1939. From *T. (C.) fenensis* it differs in the amphid structure, in having longer spicules, prerectum and in the presence of refractive radial striae (amphids stirrup-shaped, prerectum about 3 - 4 anal body widths long, radial refractive striae absent, and spicules 29 - 34 um in *T. (C.) fenensis*). From T. *(C.) coronatus* it differs in having amphids with duplex fovea, lesser 'a' value, oral disc without cuticularization and in the presence of males (amphids stirrup-shaped, not duplex, a = 35; oral disc cuticularised and males absent in *T. (C.) coronatus*).

GENUS *OOSTENBRINKIELLA* JAIRJAPURI, 1965

Jairajpuri (1965) established the genus ***Oostenbrinkiella*** for those specimens having set off lip region with a distinct labial disc, attenuated odontostyle, broadly flanged odontophore, short basal bulb of oesophagus, mono-opisthodelphic reproductive system and long, filiform tails in both sexes. ***O. oostenbrinki*** was proposed as its type and only species. Later in 1991, Dhanachand, Renubala and Mohilal reported one more species under this genus. In the present study another new species collected from the Malnad tracts is described and illustrated.

Diagnosis : (Emended). Body cylindroid, straight to slightly ventrally arcuate upon fixation. Cuticle finely transversely striated, subcuticle somewhat loose. Lip region slightly set off, labial disc prominent. Amphids stirrup-shaped, apertures slit-like. Odontostyle slightly bent at middle, ventral stiffening may be present or absent. Guiding ring single. Odontophore distinctly flanged or broad at base. Anterior part of oesophagus a slender tubular structure ending in a short cylindroid basal bulb, continuous. Vulva transverse. Female reproductive system mono-opisthodelphic, anterior uterine branch present. Males with simple spicules, lateral pieces obscure. Ventromedian supplements just an adanal pair. Tails long filiform; similar in sexes.

Type species :

Oostenbrinkiella oostenbrinki Jairajpuri, 1965

Other species :

O. shamimi Dhanachand, Renubala and Mohilal, 1991

O. ventrostylus n.sp.

OOSTENBRINKIELLA VENTROSTYLUS N.SP.

(Fig 24)

Measurements :

Holotype female : L = 1 1 mm, a = 47 5, b = 5 9, c = 5 2, c' = 13 2, V = 26, G1 = 1 1, G2 = 22, odontostyle 13 um, odontophore 8 um, oesophagus 188 um, basal bulb 51 um, prerectum 78 um, rectum 27 um, tail 213 um, ABD 13 um

Paratype females (n = 8) : L = 1 1 mm, a = 43 9 - 55 5 (49 ± 3 8), b = 5 9 - 6 4 (6 1 ± 0 2), c = 5 - 5 5 (5 2 ± 0 2), c' = 13 2 - 15 (14 ± 0 6), V = 25 - 28 (27 ± 1), G1 = 1 1 - 2 7, G2 = 16 - 22, odontostyle 12 - 13 um, odontophore 7 - 9 um, oesophagus 176 - 185 (182 ± 4 5) um, basal bulb 44 - 51 5 (46 ± 3) um, prerectum 40 - 78 (51 ± 15) um, rectum 26 - 35 um, tail 206 - 221 (215 ± 5 5) um, ABD 15 - 16 um

Paratype males (n = 5) : L = 1 - 1 1 mm, a = 45 1 - 52 5 (47 8 ± 4), b = 5 2 - 5 6 (5 5 ± 0 2), c = 4 4 - 5 2 (4 7 ± 0 4), c' = 12 5 - 14 6 (13 5 ± 0 7), T = 30 - 35 (32 5 ± 2 2), spicule 27 - 29 um, lateral guiding pieces 7 - 8 um, ventromedian supplement 'nil', odontostyle 12 um, odontophore 7 5 - 8 um, oesophagus 181 - 193 (188 ± 6) um, basal bulb 44-48 5 (46 ± 2) um, prerectum 51 5 - 96 (78 ± 23 7) um, rectum 27 - 37 um, tail 193 - 235 (219 ± 23) um, ABD 15 - 17 um

Description:

Female : Body cylindroid, about 1 mm long, straight to slightly ventrally curved upon fixation, tapering towards extremities Outer cuticle smooth, subcuticle rather loose, finely transversely striated Lateral chords about

one-fourth to one-third body width wide at mid body. Lip region set off by slight depression, narrower than adjoing body, 7 - 8 um wide, 3 um high. Labial disc distinct. Amphids wide, cup-shaped, duplex, about three-fourths lip width wide, apertures wider than fovea. Odontostyle more than one lip width long, lumen narrow, tip slightly angular, aperture pore-like. Ventral arm of the odontostyle with distinct stiffening of about 8 - 8.5 um from the base of the odontostyle. Odontophore shorter than odontostyle, knobed at the base. Guiding ring single, strongly sclerotized, at 7 um from anterior end. Oesophagus about 8 body widths long; anterior part a slender tubular structure ending in a short cylindroid basal bulb which is about one-fourth total oesophageal length, set off by constriction. Cardia elongate, rather indistinct, bluntly rounded, about 7 - 9 um long. Nerve ring at 88 - 96 um from anterior end.

Female reproductive system mono-opisthodelphic. Vulva transverse, opening wide or vera-longitudinal, weakly sclerotized, vagina almost squarish, no spincter muscles on the walls, one-half body width deep, walls weakly sclerotized. Anterior uterine branch about 12.5 - 29 um long, filled with oval-shaped sperms. Posterior branch well developed. Ovaries relfexed almost back to vulva. Oocytes arranged in a single row except at the region of multiplication. Sphincter present at oviduct-uterus junction. Prerectum about 2.7 - 4.8 anal body widths long. Rectum quite long, about 2 - 2.5 anal body widths long. Tail long filiform with acute tip, about 13 - 15 anal body widths long. Caudal pores two on each side.

Male : Similar to females except in having more curved tail portion. Testes dorylaimoid, filled with oval-shaped sperms. Spicules simple, arcuate, about 28 - 29 um long medially with well developed lateral guiding pieces.

Ventromedian supplement just an adanal pair. Prerectum comparatively longer than females, 3.2 - 6.2 anal body widths long. Tail like in females, long filiform, with acute tip, 12.5 - 15 anal body widths long with two caudal pores on each side.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) and grasses (unidentified) near Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Oostenbrinkiella ventrostylus*** n.sp./1 and paratype females and males on slides ***Oostenbrinkiella ventrostylus*** n.sp//2-4.

Relationship : ***Oostenbrinkiella ventrostylus*** n.sp. is distinct from the other species of the genus in having odontostyle with a bent tip and ventral stiffening and a longer oesophageal bulb. It closely resembles ***O. oostenbrinki*** Jairajpuri, 1965 and ***O. shamimi*** Dhanachand ***et al.*** 1991. From the former it differs in the structure of odontostyle, amphids, basal bulb, lesser b, c values, shorter tail, spicules, rectum and prerectum (odontostyle tip not bent and ventral stiffening absent; amphids stirrup-shaped, not duplex; basal bulb about 41 um or one-sixth oesophageal length; tail 245 um; spicules 26 um; rectum 17 um; prerectum 51 um in ***O.oostenbrinki***). Further from ***O. shamimi*** it differs in the odontostyle structure; shape of amphids; in having lesser a value; shorter oesophagus, tail, basal bulb, in the structure of vagina,. rectum, prerectum, in having longer odontophore and in the presence of males (odontostyle tip not bent, ventral stiffening absent; amphids stirrup-shaped; a = 41 - 46; oesophagus 162 - 173 um; basal bulb 35 - 40 um; tail 184 - 224 um; odontophore 8 - 10 um vagina with distinct sphincter muscle band proximally; rectum 20 - 26 um; prerectum 33 - 35 um and males absent in ***O. shamimi***).

SUPERFAMILY NYGOLAIMOIDEA THORNE, 1935

Thorne (1935) initially proposed the subfamily Nygolaiminae under the family Dorylaimidae De Man, 1876. Before Thorne's (1935) compilation of this group, Cobb (1913) had erected the first ever genus ***Nygolaimus***. Cobb (1922) Micoletzky (1925) and Filipjev (1928) added three more species to the genus ***Nygolaimus***. Thorne (1930) proposed a new genus ***Sectonema*** and split ***Nygolaimus*** into two subgenera, viz , ***Nygolaimus*** and ***Nygolaimium***. He (l.c.) provided a detailed monograph on the morphology and biology of ***Nygolaimus*** and transferred several species of ***Dorylaimus*** De Man (1880) to ***Nygolaimus*** the same year.

Due to the presence of muscular sheath around the basal expanded part of the oesophagus, some of the genera of nygolaim nematodes were placed under Belondiridae. It was Meyl (1961) who elevated Nygolaiminae to familial rank. Clark (1961) recognised two subfamilies, viz., Nygolaiminae and Nygolaimellinae. The family Bathyodontidae was transferred to Mononchoidea Chitwood, 1937 by Clark (1961).

Jairajpuri (1964) proposed ***Nygellus*** and ***Nygolaimellus*** under a new family Nygellidae. He (l.c.) also proposed Nygellinae and Nygolaimellinae for these genera respectively. Throne (1964) accepted Jairajpuri's (1964) classification and placed them under the superfamily Belondiroidea.

The genus ***Sectonema*** was transferred to Aporcelaimidae by Heyns (1964). A new subfamily Aetholaimidae was proposed under Nygolaimidae by Jairajpuri (1965). Nygolaimidae was given superfamilial rank by De Conink in the year 1965. Nygolaimellinae was raised to familial rank and

placed under Belondiroidea by Siddiqi (1968). Heyns (1968) made several changes in the classification. He (l.c.) proposed 10 subgenera under the genus *Nygolaimus* which were later raised to generic rank by Thorne (1974). Most of the workers doubted the validity of Nygolaimoidea including Heyns and Thorne. But in the year 1976, Andrássy accepted the superfamily and recognised two subfamilies under it. Nygolaimoidea was raised to subordinal rank by Ahmad and Jairajpuri (1979) with Campydoroidea also under it. Later in 1983, Jairajpuri removed Campydoroidea from Nygolaimoidea and raised it to subordinal rank under Dorylaimida. In the present study, it has already been mentioned that Campydorina is not considered under Dorylaimida. Classification of Nygolaimoidea by Jairajpuri and Ahmad (1992) has been followed. It has been observed that only a few genera with limited number of species were collected from the soil samples of Malnad tracts and hence it may be considered that their distribution is comparatively less in this area.

Diagnosis : (After Jairjpuri and Ahmad, 1992) Mural tooth on left subventral wall of pharynx. Pharynx eversible, in three sections, viz., distal, median and proximal; median and basal parts thick-walled, distal part, the vestibulum thin-walled. Oesophagus dorylaimoid. Rarely, basal expanded part of the oesophagus is bibulbar and usually enclosed in a thin or conspicuous sheath of muscles forming basal pockets. Three cardiac glands present or simply a cardiac disc at oesophago-intestinal junction. Female reproductive system amphidelphic or mono-opisthodelphic. Vulva transverse, rarely longitudinal. Males with massive spicules, lateral guiding pieces and ventromedian supplements. Gubernaculum may be present. Tails variable in shape and size; similar in sexes.

Type family :

Nygolaimidae Thorne, 1935

Other familieis :

Nygellidae Andrássy, 1958

Nygolaimellidae Clark, 1961

Aetholaimidae Jairajpuri, 1965

FAMILY NYGOLAIMIDAE THORNE, 1935

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle thin, with fine transverse striations on inner, outer or both layers. Lip region continuous or set off from body contour; lips usually amalgamated. Mural tooth variable in shape and size. Stoma simple, sclerotization absent. Pharynx with three sectors,eversible. Basal expanded part of oesophagus enclosed in thin or conspicuous sheath forming basal pockets. Three well developed cardiac glands present at oesophago-intestinal junction. Female reproductive system amphidelphic. Vulva transverse, rarely longitudinal. Male with massive spicules, lateral guiding pieces and ventromedian supplements. Gubernaculum present or absent. Tails variable in shape and size; similar in sexes.

Type subfamily :

Nygolaiminae Thorne, 1935

Other subfamily:

Solididentinae Ahmad and Jairajpuri, 1982

SUBFAMILY NYGOLAIMINAE THORNE, 1935

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body small to large-sized (0.7 - 7.2 mm), almost straight to strongly arcuate upon fixation. Cuticle and

subcuticle with fine transverse striations. Lip region continuous or set off from body contour. Mural tooth linear, deltoid or dorylaimoid. Cardiac glands prominent, rounded or ovoid. Vulva transverse. Female reproductive system amphidelphic. Males with arcuate spicules, lateral guiding pieces and ventromedian supplements. Gubernaculum may be present or absent. Tails variable in size and shape, short, convex-conoid, elongate-conoid, hemispherical, obtusely rounded to clavate; similar in sexes.

Type genus :

Nygolaimus Cobb, 1913

Other genera :

Aquatides Heyns, 1968

Afronygus Heyns, 1968

Clavicaudoides Heyns, 1968

Laevides Heyns, 1968

Paranygolaimus Heyns, 1968

Paravulvus Heyns, 1968

GENUS *CLAVICAUDOIDES* HEYNS, 1968

The genus *Clavicaudoides* was established by Heyns (1968) as a subgenus of *Nygolaimus* which was raised to generic rank by Thorne (1974). Ahmad and Jairajpuri (1982) proposed new combinations and made *Clavicaudoides clavicaudatus* (Altherr, 1953) as its type species. They also reported a new species under this genus. Apart from the few new combinations and the new species reported by Ahmad and Jairajpuri (1982) hardly any new addition were made under this genus. In the present study,

soil samples collected from different zones of Malnad tracts yielded specimens of ***Clavicaudoides*** which upon detailed study showed it to be a new species. The same is desribed and illustrated.

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body usually less than 2.0 mm long. Cuticle transversely striated. Mural tooth deltoid or linear Lip region rounded, continuous or set off from body contour Basal expanded part of oesophagus with conspicuous sheath. Cardiac glands ovoid or rounded. Female reproductive system amphidelphic. Vulva transverse. Males with small spicules and a few rudimentary supplements. Gubernaculum absent Rectum usually more than one anal body widths long. Prerectum about 2 - 4 anal body widths long. Tails clavate to hemispheroid; similar in sexes

Type species :

Clauvicaudoides clavicaudatus (Altherr, 1953) Ahmad and Jairajpuri, 1982

Other species:

*C. **alterri*** (Heyns, 1968) Ahmad and Jairajpuri, 1982

*C. **caudatus*** (Heyns, 1968) Ahmad and Jairajpuri, 1982

*C. **heynsi*** Altherr, 1972

*C. **liberiensis*** (Heyns, 1968) Ahmad and Jairajpuri, 1982

*C. **longicaudatus*** Abou El-Naga, 1983

*C. **longidens*** Ahmad and Jairajpuri, 1980

*C. **tenuicaudatum*** Ahmad and Jairajpuri, 1982

*C. **paratrophurus*** n.sp.

*C. **trophurus*** (Heyns, 1968) Ahmad and Jairajpuri, 1982

CLAVICAUDOIDES PARATROPHURUS N.SP.

(Fig 31)

Measurements :

Holotype female : L = 2 0 mm, a = 42 5, b = 3 5, c = 67 5, c' = 0 9, V = 51, G1 = 8, G2 = 8 7, mural tooth 8 um, oesophagus 575 um, basal expanded part of oesophagus 368 um, prerectum 72 um, rectum 18 um, tail 29 um, ABD 32 um

Paratype females (n = 4) : L = 1 9 - 2 mm, a = 42 6 = 48 5 (44 6 ± 3 4), b = 3 3 - 3 5, c = 61 8 - 77 9 (69 1 ± 8 2), c' = 0 9 - 1 0, V = 51-52, G1 = 8 - 10 5, G2 = 8 7 - 9 7, mural tooth 8 - 9 um, oesophagus 555 - 575 (567 5 ± 11) um, basal expanded part of oesophagus 368-383 (375 ± 7 5) um, prerectum 60-79 (68 5 ± 8) um, rectum 25 - 32 (29 ± 3) um, tail 25 - 30 (28 ± 3) um, ABD 29 - 32 um

Description :

Female : Body about 2 mm long, almost striaght upon fixation, cylindroid Cuticle finely transversely striated Lateral chords about one-third body width wide at mid-body Lip region slightly set off by depression, about 12 um wide, 5 - 6 um high Amphids stirrup-shaped, apertures slit-like, about one-half lip width wide Mural tooth linear, 8 - 9 um long Expanded part of oesophagus about 64 - 68% of total oesophageal length, expansion gradual, enclosed in inconspicuous sheath Cardiac glands well developed, ovoid Cardia small Nerve ring at 135 - 147 um from anterior end

Reproductive system amphidelphic Vulva a transverse slit, not sclerotized Vagina less than one-half body width deep, traingular, walls weakly sclerotized Both the gonads almost equally developed Sphincter

present at oviduct-uterus junction. Oocytes arranged in a single row excep at tip. Prerectum short, about 2.1 - 2.5 anal body widths long Rectum almost as long as anal body diameter. Tail short, slightly clavate due to thickened cuticle, about 0.9 - 1 anal body widths long, with 2 caudal

pores on each side.

Male : Not found.

Type habitat and locality : Soil around roots of tea plants (***Camellia sinensis***) from Alageswar Estate, Jayapura.

Type material : Collected in June, 1993. Holotype female on slide ***Clavicaudoides paratrophurus*** n.sp./1 and paratype females on slides ***Clavicaudoides paratrophurus*** n.sp./2-4.

Relationship : ***Clavicaudoides paratrophurus*** n.sp. closely resembles *C. **trophurus*** (Heyns, 1968) Ahmad and Jairajpuri, 1982; *C. **liberiensis*** (Heyns, 1968) Ahmad and Jairajpuri, 1982 and *C. **caudatus*** (Heyns, 1968) Ahmad and Jairajpuri, 1982. From *C. **trophurus,*** it distinctly differs in having shorter oesophagus, tail, odontostyle, more b, c values, posteriorly located nerve ring and thin cuticle on tail (oesophagus 562 - 602 um, tail 28 - 32 um; mural tooth 9 - 11 um; b = 2.9 - 3.2; c = 53 - 61; nerve ring at 119 - 132 um and cuticle at tail 8 - 9.5 um in *C. **trophurus*** vs 4 5 - 6 um). From *C. **liberiensis*** it differs in having longer body, oesophagus, mural tooth, shorter tail, less a value, more b, c, c' values, posteriorly located nerve ring and thick cuticle on the tail (L = 1.38-1.44 mm; oesophagus 476-486 um, mural tooth 6 - 7.5 um; tail 29 - 31 um; a = 55 - 64; b = 2.9 - 3 0, c = 47 -53; c' = 1.9 - 2; nerve ring at 103 - 116 um; and cuticle at tail 3.5 um

in *C. liberiensis* vs 4.5-6 um). Further, it can be differentiated from *C. caudatus* (Heyns, 1968) Ahmad and Jairajpuri, 1982 in having longer body, shorter mural tooth, posteriorly located vulva, greater a, c values, lesser b, c' values and thicker cuticle on tail (L = 1.3 mm ; a = 41; b = 4.6; c = 60; c' = 1.4; V = 39; mural tooth 11 um; cuticle at tail 2 um in *C. caudatus* vs 4 - 6.5 um).

GENUS *AQUATIDES* HEYNS, 1968

The genus ***Aquatides*** was established by Heyns (1968) as a subgenus of ***Nygolaimus*** which was raised to generic rank by Thorne (1974) ***Aquatides aquaticus*** (Thorne, 1930) Thorne, 1974 was proposed as its type species Ahmad and Jairajpuri (1982) while reporting a new species made several new combinations and recognised 8 species They (l c) kept ***A. kaburakii*** (Imamura, 1931) as ***species inquirenda*** No more new additions were made afterwards except Andrássy's (1986) synonymisation of ***A. firigidus*** In the present study, a new species of ***Aquatides*** was collected and the same is described and illustrated A known species also is reported

Diagnosis : (Emended) Body small to medium-sized, straight to slightly ventrally arcuate upon fixation Mural tooth linear, usually longer than lip width or equal Cuticle and subcuticle finely striated Lip region rounded or truncate, set off by slight depression Basal expanded part of oesophagus surrounded by a conspicuous sheath usually forming basal pockets Cardiac glands spherical or oval, well developed Cardia prominent Vulva transverse Female reproductive system amphidelphic Males with massive and arcuate spicules, well developed gubernaculum, lateral guiding pieces and ventromedian suplements Prerectum 1 2 - 4 anal body widths long Tails bluntly conoid to hemispheroid, similar in sexes

Type species :

Aquatides aquaticus (Thorne, 1930) Thorne, 1974

Other species :

A. christei (Heyns, 1968) Thorne, 1974

A. christicki Ahmad and Jairajpuri, 1982

A. deconincki Jairajpuri and Coomau, 1977

A. frigidus (Steiner, 1916) Andrássy, 1986

A. intermedius (Loof, 1961) Ahmad and Jairajpuri, 1982

A. minutus n.sp.

A. rotundicaudatus Thorne, 1974

A. shadini (Filipjev, 1928) Ahmad and Jairajpuri, 1982

A. smoliki Thorne, 1974

A. thornei (Schneider, 1937) Ahmad and Jairajpuri, 1982

Species inquirenda :

A. kaburakii (Imamura, 1931)

AQUATIDES THORNEI (SCHNEIDER, 1937) AHMAD AND JAIRAJPURI, 1982

Measurements :

Females (n = 9) : L = 1.3 - 2 (1.6 ± 0.2) mm; a = 38 - 49 (42 ± 3 6); b = 3 8 - 4 2 (4 ± 0.3); c = 56 - 81 (66.6 ± 8.3); c' = 0.8 - 1.1 (1 ± 0.1), V = 46 - 51; G1 = 7 - 13; G2 = 6 - 12; mural tooth 15 - 16 um; oesophagus 375 - 510 um (409 ± 46) um; basal expanded part 180 - 300 (228 ± 37) um, nerve ring 113 - 155 um; cardia 9-10.5 um; prerectum 42-75 (54 ± 24) um; rectum 22.5-30 um; tail 22.5 - 27 um; ABD 24 - 27 um.

Male (n = 1) : L = 1.5 mm; a = 46.4; b = 3.9; c = 64.9; c' = 1.0; T = 60 6, spicule 33 um; lateral guiding pieces 6 um; ventromedian supplements 6, mural tooth 14 um; oesophagus 372 um; basal expanded part 203 um, nerve ring 117 um; cardia 9 um; prerectum 82.5 um; rectum 33 um, tail 22.5 um; ABD 22.5 um.

Habitat and locality : Soil around roots of paddy (*Oryza sativa*) and grasses (unidentified) from Muthinakoppa

Remarks : The present specimens conform well with *A. thornei* (Schneider, 1937) Ahmad and Jairajpuri, 1982 except in having slender body, longer oesophagus, spicule and more ventromedian suplements (a = 32, oesophagus 388 um, spicule 43 um and ventromedian supplements 5 in *A. thornei*)

AQUATIDES MINUTUS N.SP.

(Fig 31)

Measurements :

Holotype female : L = 0 9 mm, a = 40 7, b = 3 9, c = 78 8, c' = 0 8, V = 43, G1 = 12 1, G2 = 11 6, mural tooth 10 um, oesophagus 240 um, basal expanded part of oesophagus 113 um, prerectum 22 um, rectum 22 um, tail 12 um, ABD 15 um

Paratype females (n = 6) : L = 0 9 - 1 1 (1 0 ± 0 1), mm, a = 37 6 - 45 1 (42 3 ± 3 3), b = 3 6 - 4 (3 8 ± - 2), c = 45 1 - 79 (69 ± 16), c' = 0 8 - 1 5, V= 42 5 - 49 (45 5 ± 2 7), G1 = 7 7-9 5, G2 = 7 - 10, mural tooth 9 - 11 um, oesphagus 240 - 285 (260 ± 21) um, basal expanded part of oesophagus 117 - 142 (131 ± 11) um, prerectum 20 - 30 (28 ± 2) um, rectum 14 - 18 um, tail 12 - 22 5 (15 ± 5) um, ABD 15 um

Description :

Female : Body small, about 1 um long, straight to slightly ventrally arcuate upon fixation Cuticle finely transversely striated Lateral chords about one-fourth body width wide at midbody Lip region set off by depression, 9 - 11 um wide, 4 - 4 5 um high Amphids stirrup-shaped, as wide as lip height

Mural tooth linear, attenuated, lumen distinct Basal expanded part of oesophagus about 49 - 53% of total oesophageal length, surrounded by

inconspicuous but distinct sheath making basal pockets Cardiac glands well developed , ovoid. Cardia about 6 - 9 um long. Nerve ring at 82 - 98 um from anterior end DO and DN far behind expansion.

Reproductive system amphidlephic. Vulva transverse, not sclerotized, vagina less than one-half body width deep, triangular Both gonads almost equally doveloped. Uterus short, sperms absent. Sphincter present at oviduct-uterus junction. Prerectum about 1.3 - 2 5 anal body widths long Rectum about one anal body width long. Tail short, slightly clavate with thick cuticle and 2 - 3 caudal pores on each side.

Male : Not found.

Type habitat and locality : Soil around roots of paddy (***Oryza sativa***) and grasses (unidentified) from Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Aquatides minutus*** n.sp./1 and paratype females on slides ***Aquatides minutus*** n.sp./2-4.

Relationship : ***Aquatides minutus*** n.sp. comes closer to ***A. intermedius*** (Loof, 1961) Ahmad and Jairajpuri, 1982 and ***A. thornei*** (Schneider, 1937) Ahmad and Jairajpuri, 1982. From the former it differs in having smaller body, shorter oesophagus, tail, narrower lip region, shorter mural tooth and anteriorly located nerve ring (L = 1.6 - 2.1 mm; oesophagus 430 - 478 um, tail 26 - 28 um; lip region 14.5 - 16.5 um; mural tooth 17 - 19 um and nerve ring 115 - 153 um in ***A. intermedius***) Further, from ***A. thornei***, it differs in the absence of males, shorter body, oesophagus, tail, anteriorly located vulva, narrower lip region, shorter mural tooth and anteriorly located nerve ring (males present; L = 1.24 - 2.28 um; V = 47 - 54; lip region 14.5 - 17 um; mural tooth 12 - 17 um and nerve ring at 111 - 150 um in ***A. thornei***).

SUBFAMILY SOLIDIDENTINAE AHMAD AND JAIRAJPURI, 1982

Diagnosis : (After Jairajpuri and Ahmad,1992) Body small to medium-sized, about 1 - 3 um long, almost straight to strongly ventrally arcuate ('C' or 'S'-shaped) with fixation folds Subcuticle distinctly, transversely striated Lip region usually set off from body contour Mural tooth small, solididentoid or acicular Cardiac glands small, rounded or ovoid Vulva transverse Female reproductive system amphidelphic Males with arcuate spicules, ventromedian supplements 1-3, poorly developed Gubernaculum absent Tail short, bluntly rounded, hemispheroid or long, with clavate terminus

Type genus :

Solididens Heyns, 1968

Other genera :

Clavicauda Heyns, 1968

Feroxides Heyns, 1968

GENUS *SOLIDIDENS* HEYNS, 1968

The genus *Solididens* was established by Heyns (1968) as a subgenus of **Nygolaimus** which was raised to generic rank by Thorne (1974) *S. bisexualis* (Thorne, 1939) Thorne, 1974 was proposed as its type species New combinations were proposed by Ahmad and Jairajpuri (1982) After the proposal of the genus by Thorne (1974) there are no more new reports for this genus In the present study, a known species was collected and is reported

Diagnosis : (After Jairajpuri and Ahmad, 1992). Body usually less than 2.5 mm, ventrally arcuate, 'C'-shaped or twisted in form of letter 'S'. Lateral body pores indisnct. Subcuticle transversely striated. Lip region distinctly set off from body contour. Tooth solid, with sharply pointed, slender distal protion, always shorter than lip width. Basal expanded part of oesophagus enclosed in thin or inconspicuous sheath. Cardiac glands small, ovoid. Female reproductive system amphidelphic. Vulva transverse. Males with a few ventromedians and small lateral guiding pieces. Gubernaculum absent. Tails short, conoid to bluntly conoid, hemispheroid; similar in sexes.

Type species :

Solididens bisexualis (Thorne, 1939) Thorne, 1974.

Other spceis :

S. australis (Heyns, 1968) Ahmad and Jairajpuri, 1982

S. capensis (Heyns, 1968) Ahmad and Jairajpuri, 1982

S. spiralis (Loos, 1946) Ahmad and Jairajpuri, 1982

S. trichodorus (Andrássy, 1965) Ahmad and Jairajpuri, 1982

S. vulgaris (Thorne, 1930) Thorne, 1974

S. xosorum (Heyns, 1968) Ahmad and Jairajpuri, 1982

SOLIDIDENS AUSTRALIS (HEYNS, 1968) AHMAD AND JAIRAJPURI, 1982

Measurements :

Female (n=5) : L = 1.4-1.6 (1.5±0.1) mm; a = 41.4-51.5 (43.0 ±1.5); b = 3.2 - 3.8 (3.5±0.3); c = 43.2-55 (51.4 ± 7.1); c' = 1.1 - 1.6 (1.3 ± 0.3);

V = 51 - 55 (52 ± 2); G1 = 6.8 - 8.3; G2 = 7.5 - 8.4; mural tooth 7.5 - 8 um; oesophagus 405 - 443 (422.5 ± 19) um; basal expanded part of oesophgaus 255 - 270 (263 ± 7.5) um; cardia 7.5 - 10.5 um; nerve ring 98 - 120 um; prerectum 31.5 - 43.5 (36.5 ± 6) um; rectum 20 - 26 um; tail 25 - 33 (29 ± 4) um; ABD 21 - 24 (23 ± 1.6) um.

Male : Not found.

Habitat and locality : Collected from soil around roots of coffee plants (***Coffea arabica***) from Mudigere, Chikmagalur Distt.

Remarks : The present speimens conform well with ***S. australis*** (Heyns, 1968) Ahmad and Jairajpuri, 1982 except in having posteriorly located vulva, longer basal expanded part of oesophagus, prerectum and in the absence of males (V = 45 - 52; basal expanded part of oesophagus 55 - 60% vs 59 - 64%; prerectum 25 - 32 um and males present in ***S. australis***).

GENUS *CLAVICAUDA* HEYNS, 1968

The genus ***Clavicauda*** was proposed as a subgenus of ***Nygolaimus*** by Heyns (1968) which was raised to generic rank by Thorne (1974) *C. **symmetricus*** (Williams, 1958) Ahmad and Jairajpuri, 1982 was the only species described under this genus so far Males were not reported for this genus In the present study, soil samples of different localities of Malnad yielded a female of ***C. symmetricus*** and males and juveniles of a new species are described and illustrated

Diagnosis : (Emended) Body medium-sized, slender, almost striaght upon fixation Outer cuticle smooth Subcuticle finely transversely striated Lip region distinctly set off by depression Mural tooth acicular with a furcate base, less than one lip width long Cardia inconspicuous, cardiac glands ovoid A large glandular organ may be present at base of oesophagus Sheath surrounding the basal expanded part of oesophagus inconspicuous Female reproductive system amphidelphic Vulva transverse Male with arcuate spicules, well developed lateral pieces and just an adanal pair of ventromedian supplement Tails long, cylindroid, then clavate at the terminus, similar in sexes.

Type species :

Clavicauda symmetricus (Williams, 1958) Heyns, 1968

Other species :

Clavicauda differentialis n.sp.

CLAVICAUDA SYMMETRICUS (WILLIAMS, 1958) AHMAD AND JAIRAJPURI, 1982

(Fig 32)

Measurements :

Female (n = 1) : L = 1 5 mm, a = 51 6, b = 3 2, c = 15 5, c' = 5 4, V = 47, G1 = 7, G2 = 7, mural tooth 7 5 um, oesophagus 459 um, basal expanded part of oesophagus 257 um, nerve ring 120 um; prerectum 29 um, rectum 25 um, tail 96 um, ABD 18 um

Male : Not found

Habitat and locality : Collected from soil around roots of jack tree, Nethrakonda Estate, Chikmagalur Distt

Remarks : The present specimen conforms well with the Indian population of *Clavicauda symmetricus* (Williams, 1958) Ahmad and Jairajpuri, 1982, except in having shorter basal expansion of esophagus, thin cuticle and narrow anal body diameter (basal expansion 62 - 69% vs 56%, cuticle 1 - 2 um at mid body, 4 - 6 um at tail in *C. symmetricus* vs 1 um at mid body, 2 - 5 um at tail)

CLAVICAUDA DIFFERENTIALIS N.SP.

(Fig. 32)

Measurements :

Holotype male : L = 1 7 mm, a = 68 8, b = 3 4, c = 11 9, c' = 7 9, T = 49, spicule 32 um, lateral guiding pieces 5 um, mural tooth 6 um, oesophagus 505 um, basal expanded part of oesophagus 321 um, prerectum 68 um, rectum 38 um, tail 145 um; ABD 18 um.

Paratype male (n = 1) : L = 1 5 mm, a = 60.8, b = 3 1, c = 13 3, c' = 6 8, T = 49, spicule 31 um, lateral guiding pieces 5 um, mural tooth 6 um, oesophagus 489 um, basal expanded part 321 um, prerectum 62 um, rectum 36 um, tail 115 um, ABD 17 um

Juveniles (n = 3) : L = 1 1 - 1 4 mm, a = 56 5 - 63 1, b = 3 0 - 3 9, c = 11 2 - 14 4, c' = 6 2 - 8 3, mural tooth 5 - 6 um, oesophagus 292 - 453 um, basal expanded part of oesophagus 176 - 257 um, prerectum 28 - 41 um, rectum 18 - 23 5 um, tail 89 - 122 um, ABD 14 - 16 um

Description :

Male : Body moderate-sized, slender, tapering towards extremities, almost straight upon fixation Subcuticle finely, transversely striated Lateral chords about one-fourth body width wide at mid body Lateral body pores indistinct Lip region set off from body contour by depression, lips conoid-rounded Amphids stirrup-shaped, about 5 um wide, apertures slit-like Mural tooth acicular, base furcate, slightly more than one-half lip width long Oesophagus moderately muscular, basal expansion almost indistinct, about 64 - 66% of total oesophageal length Muscle sheath surrounding basal part of oesophagus inconspicuous Nerve ring at 122 - 137 um from anterior end, distinct Cardia indistinct Cardiac glands ovoid DO and DN far away from expansion SVN inconspicuous

Testes dorylaimoid, about 49% of total body length, filled with oval-shaped sperms Spicules arcuate, broad at mid portion, distal end bluntly pointed Lateral guiding pieces about one-sixth spicular length long

Ventromedian supplement just an adanal pair. Prerectum about 3.6 -3.8 anal body widths long. Rectum about 2.1 anal body widths long Tail cylindroid, then narrowed to some distance and then ending in a clavate terminus, about 7 - 8 anal body widths long. Caudal pores two on each side, obscure

Juveniles : Resemble adult males in general morphology except in having smaller body size and there by body ratios. Prerectum, rectum and tail comparatively shorter Caudal pores indistinct.

Type habitat and locality : Soil around roots of aquatic grasses (unidentified) near Sringeri.

Type material : Collected in May, 1993. Holotype male on slide ***Clavicauda differentialis*** n.sp./1 and paratype male and juveniles on slides ***Clavicauda differntialis*** n.sp./2-4.

Relationship : ***Clavicauda differentialis*** n.sp. is different from the only other species *C. **symmetricus*** (Williams, 1958) Ahmad and Jairajpuri, 1982 in the presence of males, longer body and there by different body ratios (males absent; L = 1.21 - 1.41 mm; a = 46 - 55; c = 13 - 17; c' = 5 - 7, mural tooth 7 - 8 um; oesophagus 375 - 435 um; basal part of oesophagus 62 - 64%, nerve ring 100 - 110 um from anterior end; prerectum 24 - 40 um, rectum 18 - 25 um; tail 85 - 102 um and ABD 14 - 16 um in the females of *C. **symmetricus***).

FAMILY NYGELLIDAE ANDRÁSSY, 1958

Diagnosis : (After Jairajpuri and Ahmad, 1992). Cuticle thin with fine, transverse striations. Lip region continuous with body contour Mural tooth linear or deltoid Stoma simple, not sclerotized Pharynx eversible, in three sections Basal expanded part of oesophagus enclosed in a spiral sheath Three cardiac glands present at base of oesophagus Female reproductive system mono-opisthodelphic. Vulva transverse Tails usually clavate Males not known

Type and only subfamily :

Nygellinae Andrássy, 1958

SUBFAMILY NYGELLINAE ANDRÁSSY, 1958

Diagnosis : (Emended) Body generally small, striaght to slightly ventrally arcuate Cuticle and subcuticle finely transversely striated Lip region continous with body contour or set off by slight depression Mural tooth small, about 5 - 9 mm long, linear or deltoid Basal expanded part of oesophagus enclosed in distinct or inconspicuous sheath of muscles, may be spiral or simple pockets at the base. Cardiac glands small, ovoid Female reproductive system mono-opisthodelphic. Vulva transverse Tail short, elongate-clavate Males not known

Type and only genus :

Nygellus Thorne, 1939

GENUS *NYGELLUS* THORNE, 1939

The genus ***Nygellus*** was established by Thorne (1939) with ***N. clavatus*** as its type species ***N. subclavatus*** by Timm and Ameen (1960) and ***N. mozammili*** by Jairajpuri (1965) were the species described so far In the present study, soil smaples from different parts of Malnad tracts yielded a new species of ***Nygellus*** which is described and illustrated

Diagnosis : (Emended) Body small, almost straight upon fixation Cuticle and subcuticle finely transversely striated Lateral chords about one-fourth to one-third body width wide at midbody Lip region continuous or set off from body contour by slight depression, slightly asymmetrical at the tip Mural tooth about 5 - 9 um long, linear or deltoid Basal expanded part of oesophagus enclosed in distinct or inconspicuous muscular sheath, simple or spiral Cardiac glands small, ovoid Female reproductive system mono-opisthodelphic Vulva transverse Anterior uterine branch may be present Tails short or elongate-clavate Males not known

Type species :

Nygellus clavatus Thorne, 1939

Other species :

N. subclavatus Timm and Ameen, 1960

N. mozammili Jairajpuri, 1965

N. zingli n sp

Species inquirendae :

N. brachyuris Sukul, 1973

NYGELLUS ZINGLI N.SP.

(Fig 32)

Measurements :

Holotype female : L = 1 5 mm, a = 53 5, b = 3 9, c = 46 2, c' = 2 0, V = 32 5, G2 = 13 0, oesophagus 387 um, mural tooth 7 5 um, prerectum 32 um, rectum 30 um, tail 32 um, ABD 16 um

Paratype females (n = 9) : L = 1 3 - 1 5 (1 4 ± 0 1) mm, a = 44 5 - 52 7 (48 4 ± 2 6), b = 3 1 - 3 9 (3 4 ± 0 3), c = 35 6 - 43 3 (39 9 ± 2 8), c' = 2 - 2 5 (2 3 ± 0 2) V = 33 5 - 41 (37 2 ± 2 4), G2 = 10 - 24 5, oeosphagus 368-444 (422 ± 26) um, mural tooth 8 - 9 um, prerectum 30- 45 (38 ± 9) um, rectum 23 - 33 (29 ± 4) um, tail 33 - 43 (37 ± 5) um, ABD 15 - 17 um

Description :

Female : Body almost straight upon fixation, some times middle portion bent dorsally, tapering anterior to base of oesophagus Cuticle and subcuticle finely transversely striated, 1 um at midbody and 2 um at tail Body pores indistinct Lip set off by slight depression, slightly asymmetrical at the tip, 10 - 11 um wide, 4 - 4 5 um high Amphids cup-shaped, apertures about 5 um wide, slit-like Mural tooth linear, 8 - 9 um or less than one lip width long Basal expanded part of oesophagus occupying about 53 - 61% of total oesophageal length Nerve ring at 111 - 132 um from anterior end Muscle sheath enclosing the basal expanded part of oesophagus not distinguishable but basal pockets at the base of oesophagus is very clear Cardiac glands ovoid

Reproductive system mono-oposthodelphic. Vulva transverse, distinctly inclined posteriad, anterior reproductive branch completely absent. Vaginal walls weakly sclerotized. Ovary reflexed almost back to vulva, oocytes arranged in a single line except at tip. Sphincter present at oviduct-uterus junction Prerectum about two anal body widths long Rectum almost equal to prerectum. Tail short, clavate, 2 - 2.5 anal body widths long Caudal pores two on each side.

Male : Not found.

Type habitat and locality : Soil around roots of grasses (unidentified) and paddy (***Oryza sativa***) from Muthinakoppa.

Type material : Collected in July, 1993. Holotype female on slide ***Nygellus zingli*** n.sp./1 and paratype females on slides ***Nygellus zingli*** n.sp./2-4

Relationship : ***Nygellus zingli*** n.sp. closely resembles ***N. subclavatus*** Timm and Ameen, 1960 and ***N. mozammili*** Jairajpuri, 1965. From ***N. subclavatus***, it differs in having slightly longer body, greater a, b, c, c' values, longer gonads and in the absence of muscular sheath around the basal expanded part of oesophagus (L = 1.2 - 1.3 um; a = 42 - 48; b = 3.2 - 3.5, c = 32 - 37, c' = 2.7 - 3; G2 = 9 - 15; anterior uterine branch rudimentary and basal expanded part of oesophagus enclosed in thin muscular sheath in ***N. subclavatus).*** Further, from ***N. mozammili***, it distinctly differs in having lesser a, c, c' values, bigger mural tooth, ratio between rectum and prerectum and in the absence of anterior uterine branch (a = 50 - 58; C = 50 - 67, c' = 1.5; mural tooth 5 um; rectum, prerectum ratio about 1 : 3 and anterior uterine branch rudimentary in ***N. mozammili***).

PART - II

THE MONONCHS

INTRODUCTION

Nematodes belonging to the order Mononchida are economically important because of their role in the bio-control of soil and plant-parasitic nematodes They can be very easily spotted under the microscope even at low magnifications due to their broad and strongly sclerotized buccal cavities They are found in all sorts of soil and fresh water habitats They feed on predominantly soil and plant-parasitic nematodes, protozoans, rotifers, small oligochaets etc Rarely, they may exhibit cannibalism

Predatory behaviour of mononchs was first observed by Steiner and Heinly in 1922 They (l c) observed a single specimen of ***Mononchus papillatus*** Bastian, 1865 predating upon 1332 nematodes in a period of 12 weeks Thorne (1927) suggested that ***M. papillatus*** can be used in the bio-control of sugar-beet nematode, ***Heterodera schachtti*** Schmidt, 1871 Cassidy (1931) and other workers reported predatory behaviour of mononchs on several phytophagous nematodes Since then many workers have contributed valuable information on mononch taxonomy and their predatory potentiality

In India, research on mononchs started in the early sixties Kannan (1960 and 1961) reported a few species from South India but his Descriptions were very poor It was Jairajpuri (1969 and subsequent papers) who did valuable work on the taxanomy and distribution of mononchs in a systematic way Jairajpuri and Khan's (1982) book on mononchs is a very useful guide for the researchers in this field

The present study provides an account of the morphology, taxonomy and diagnostic features of various groups of the Order Mononchida which collected from different regions of the Malnad tracts of Karnataka. All the new species and genus are described in detail with adequate illustrations and their diagnostic relationships have been given. Dimensions and brief remarks are given for the known species. The mononchs are represented by a few genera only. The Malnad tracts yielded 9 different genera including a new genus. A total of 22 species were collected and are reported in this thesis. It is felt that the Malnad tracts could be rich in mononchs also but more collections must be made. Identification of these nematodes may help in further research on their role in bio-control of nematodes.

HISTORICAL BACKGROUND

Studies on mononchs started as early as 1845 when Dujardin first reported the species of predatory nematodes under the name ***Oncholaimus muscorum, O. fovearum*** and ***Enoplus cassiusculus***. However, the type genus ***Mononchus*** was proposed only in the year 1865 by Bastian who also described five new species, viz., ***Mononchus truncatus, M. papillatus, M. macrostoma, M. tunbridgensis*** and ***M. cristatus***. He (l.c.) also transferred Dujardin's three species under ***Mononchus***. After a gap of about 50 years, during 1916 and 1917 Dr. N.A. Cobb, the greatest nematologist of all times, provided useful information on their biology and ecology and split the genus ***Mononchus*** into five subgenera, viz., ***Mononchus, Prionchulus, Mylonchulus, Iotonchus*** and ***Anatonchus***. He (l.c.) later on declared that all these five subgenera would ultimately become independent genera. In 1917, he published his authoritative paper on mononchs which till to-date is one of the most valuable contributions on mononchs. He had proposed another subgenus, ***Sporonchulus*** and described 32 new species. Micoletzky (1922) recognized only 41 species. Thorne (1924) published excellent papers on the mononchs of Utah, U.S.A. In 1927, he studied the feeding habits, life-history and economic importance of mononchs in relation to the biological control of plant-parasitic nematodes. Almost at the same time, Steiner and Heinly (1922) explored the possibilities of controlling the cyst-forming nematodes, ***Heterodera radicicola*** and some other plant-parasitic nematodes using predatory nematodes, especially ***Clarkus papillatus***.

Wu and Hoeppli (1929) raised ***Prionchulus*** to generic rank. Cassidy (1931) worked on mononchs collected from Hawaii. In 1937, Chitwood proposed the family Mononchidae under the superfamily Tripyloidea, Suborder Enoplina, Order Enoplida for the genera ***Mononchus*** and ***Prionchulus*** and the subgenera ***Mylonchulus, Iotonchus, Anatonchus*** and ***Sporonchulus***. De Coninck (1939) raised ***Anatonchus*** to generic rank, while Altherr (1950 & 1953) raised ***Iotonchus*** and ***Mylonchulus*** to generic status. ***Sporonchulus*** was given generic status by Pennak (1953). In 1958, Andrássy added five more genera, viz., ***Branchonchulus, Cobbonchus, Granulonchulus, Judonchulus*** and ***Miconchus*** under the family Mononchidae and revised the mononchs. Clark (1961) brought the family Mononchidae under the Suborder Dorylaimina together with a new family Bathyodontidae and raised it to superfamilial rank. He (l.c.) was of the opinion that this family represented a transitional kinship between Mononchoidea and Dorylaimoidea. In a series of papers,Clark (1960, 1961, 1962 & 1963) dealt with mononchs collected from New Zealand and provided valuable information. It was Clark who diagnosed the importance of presence or absence of 'tubercles' in the oesophago-intestinal junction and their correlation with the shape of buccal cavity. Mulvey (1961, 1962, 1963, 1967) also published serial papers entitled "The Mononchidae : A family of Predaceous nematodes" from Canada. In these papers Mulvey reviewed a large number of known species and described new species belonging to various genera of mononchs and provided keys for their identification. Mulvey and Jensen (1967) published an account of the mononchs from Nigeria and

proposed 16 new species and four new genera, viz., *Crassibucca, Hadronchus, Polyonchulus* and *Prionchulellus*. Coetzee (1965, 1966, 1967 & 1968) also published serial papers on South African mononchs and described several known and new species of the genera *Cobbonchus, Granonchulus, Mylonchulus, Iotonchus, Mononchus* and *Prionchulus*. Jensen and Mulvey (1968) while describing "Predaceous Nematodes (Mononchidae) of Oregon" reported 24 known and five new species of the following genera, viz., *Mylonchulus, Prionchulus, Anatonchus, Miconchus, Mononchus* and *Iotonchus*. Williams (1958), Andrássy (1959), Buangsuwon and Jensen (1966), Yeates (1967), Altherr (1968), Lordello (1970), Thong (1970), etc., have contributed some valuable papers on mononchs.

In India, till 1969 not much work has been done on the mononchs except some preliminary reports by Kannan (1960, 1961). It was Jairajpuri (1969, 1970 & 1971) who worked on Indian mononchs and described a number of known and new species of genera like *Hadronchus, Miconchus, Iotonchus, Mononchus, Clarkus, Mylonchulus, Sporonchulus,* etc. He (l.c.) revised the systematics of mononchs and gave them an independent Ordinal rank. In 1971, he recognised two Suborders, viz., Mononchina Kirjanova and Krall, 1969 with two superfamilies Mononchoidea and Anatonchoidea ; Bathyodontina Coomans and Loof, 1970 with two superfamilies, Bathyodontoidea and Mononchuloidea. Five families under Mononchina, three under Mononchoidea and two under Anatonchoidea were recognised. In 1973, Baqri and Jairajpuri added two genera *Actus* and

Paracrassibucca from El Salvador. Jairajpuri and Khan (1975, 1977) Khan and Jairajpuri (1978, 1979 & 1980) described a new genus, some new species and several known species and first reports from India.

Mulvey (1978) reviewed Mononchidae from Canada and recognized 23 genera including two new ones, ***Paramononchus*** and ***Parahadronchus*** and also described three new species with a key for identification of various genera. Rizzhivin (1971), Andrássy, (1973, 1976) Eroshenko (1972, 1975), Altherr (1971, 1974) and Tsalolikhin (1975) have contributed more information on taxanomic studies on mononchs. Jairajpuri's (1969) proposal of Ordinal rank to mononchs has been accepted by majority of the workers. Jairajpuri and Khan (1982) divided Mononchida into two Suborders, Mononchina and Bathyodontina. Under Mononchina two superfamilies, viz., Mononchoidea with non-tuberculate and Anatonchoidea with tuberculate type of oesophago-intestinal junction. The families Mononchidae, Mylonchulidae and Cobbonchidae were proposed under Mononchoidea, while Anatonchidae and Miconchidae were kept under Anatonchoidea. The Suborder Bathyodontina consists two superfamilies, viz., Bathyodontoidea and Mononchuloidea. During the last three decades, much work has been done on mononchs especially on their morphology, biology, ecology and inter-relationships. More recently, Andrássy (1992, 1993) while presenting taxonomic surveys of the families of Mononchoidea in a series of papers, distinguished Mononchidae Chitwood, 1937, Anantonchidae, Jairajpuri, 1969 and Mylonchulidae Jairajpuri, 1969 as families under it. However, he did not comment on the Suborder Bathyodontina Coomans and Loof, 1970. He (l.c.)

considered the family Mononchidae with two subfamilies, viz., Mononchinae Chitwood, 1937 and Cobbonchinae Jairajpuri, 1969. The family Mylonchulidae Jairajpuri, 1969 was recognised with only one subfamily Mylonchulinae Jairajpuri, 1969. Under the family Anatonchidae, three subfamilies, viz., Iotonchinae Jairajpuri, 1969, Anatonchinae Jairajpuri, 1969 and Miconchinae Andrássy, 1976 were proposed.

Being more recently studied and reasonably justified, Andrássy's (1992, 1993) classification is accepted and followed in the present study. Suborder Bathyodontina and its systematics proposed by Jairajpuri and Khan (1982) is followed as such.

ORDER MONONCHIDA JAIRAJPURI, 1969

Diagnosis : (After Jairajpuri and Khan, 1982). Nematodes with large, stout body and thick cuticle. Lip region generally expanded with well developed lips and labial papillae. Buccal cavity strongly sclerotized, usually posterior one-fourth or whole of it embedded in oesophageal tissues, provided with tooth or teeth, with or without longitudinal ventral ridges. Denticles may or may not be present on the subventral walls. Amphids small, generally goblet shaped, always post-labial. Oesophagus long, cylindrical, strongly muscular with greatly thickened lumen. Oesophago-intestinal junction may be tuberculate or non-tuberculate. Oesophageal glands uninucleate, one dorsal and two pairs of subventrals, their orifices posterior to nerve ring. Excretory pore may or may not be present. If present, visible with an ampulla, a pair of excretory ducts which terminate in a large uninucleate renette cell. Female reproductive system mono-prodelphic, mono-opisthodelphic or amphidelphic with or without vulval papillae. Males with a series of ventromedian supplements, adanal pair absent. Spicules usually massive, paired, identical, gubernaculam and accessory pieces usually present. Caudal glands three, uninucleate, grouped or tandem, spinneret terminal or subterminal. Generally inhabit soil, rarely fresh water, predatory in nature.

Type Suborder :

Mononchina Kirjanova and Krall, 1969

Other Suborder :

Bathyodontina Coomans and Loof, 1970

SUBORDER MONONCHINA KIRJANOVA AND KRALL, 1969

Diagnosis : (Emended). Generally large-sized nematodes. Lip set off by expansion, labial papillae well developed. Buccal cavity strongly sclerotized. Buccal cavity walls provided with dorsal tooth and with or without subventral teeth and denticles. Amphids small, always post-labial. Oesophagus strongly muscular, cylindrical, lumen thick. Oesophago-intestinal junction tuberculate or non-tuberculate. Excretory pore may or may not be present. Female reproductive system monodelphic or amphidelphic. Vulva with or without papillae. Males with few to numerous serially arranged ventromedian supplements. Adanal pair of supplements absent. Spicules generally massive, arcuate. Gubernaculum and lateral guiding pieces present. Caudal glands present. They are arranged in groups or tandem. Spinneret and caudal opening may or may not be present; if present either terminal or subterminal. Exclusively predatory in nature. Tails variable in size and structure, similar in sexes.

Type and only Superfamily :

Mononchoidea Chitwood, 1937

SUBORDER BATHYODONTINA COOMANS AND LOOF, 1970

Diagnosis : (After Jairajpuri and Khan, 1982). Nematodes with narrow stoma composed of different sections, embedded almost entirely in oesophageal tissue. Sclerotization of stoma weak to strong. A distinct tooth of varying size present, with or without denticles. Dorsal oesophageal gland nucleus far behind the orifice, sometimes

at level of first subventral gland nuclei. First subventral gland nuclei are also far behind first subventral gland orifice. Tail short, rounded or hemisheroid with well developed caudal glands and spinneret. Spinneret subterminal ventrally or dorsally. Males not reported for this group.

Type Superfamily :

Bathyodontoidea Clark, 1961

Other Superfamily :

Mononchuloidea De Conink, 1965

SUPERFAMILY MONONCHOIDEA CHITWOOD, 1937

Diagnosis : (Emended). Small to large-sized nematodes. Buccal cavity large, thick-walled, barrel-shaped or tapering at base. Dorsal tooth present, small to massive, its apex either facing anteriad or posteriad. Subventral teeth and denticles present or absent. If present, the denticles may be arranged in transverse rows or on longitudinal ridges. Amphids small, post labial. Oesophagus muscular, lumen thick-walled. Oesophago-intestinal junction tuberculate or non-tuberculate. Excretory pore present or absent. Female reproductive system monodelphic or amphidelphic. Vulva usually sclerotized, with or without vulval papillae. Males with few to numerous serially arranged ventromedian supplements. Adanal pair absent. Spicules massive, arcuate, provided with lateral accessory pieces. Gubernaculum generally present. Caudal glands conspicuous or inconspicuous, if present either grouped or tandem. Caudal opening and spinneret may or may not be present. Tails highly variable in shape, structure and size, similar in sexes.

Type family :

Mononchidae Chitwood, 1937

Other families :

Mylonchulidae Jairajpuri, 1969

Anatonchidae Jairajpuri, 1969

FAMILY MONONCHIDAE CHITWOOD, 1937

Diagnosis : (After Andrássy, 1993). Medium to large-sized nematodes,

generally well over 1 mm. Buccal cavity spacious, more or less oval, tapering at base. Dorsal tooth large, predominantly located in the anterior part of stoma and always pointing forward. Subventral walls either smooth or provided with large teeth or small denticles arranged in longitudinal ridges or scattered irregularly. Oesophago-intestinal junction non-tuberculate.

Type Subfamily :

Mononchinae Chitwood, 1937

Other Subfamily :

Cobbonchinae Jairajpuri, 1969

SUBFAMILY MONONCHINAE CHITWOOD, 1937

Diagnosis : (Emended). Dorsal wall of buccal cavity armed with a large tooth predominantly situated in the anterior part, very rarely near the mid-region of stoma and always directed forward. Subventral walls without large teeth but usually with smooth or serrate longitudinal ridges or small denticles. Spicules and accessory pieces extremely long and slender. Tails elongate or short, bluntly rounded. Caudal glands, their ducts and spinneret well developed, very rarely absent.

Type genus :

Mononchus Bastian, 1865

Other genera :

Actus Baqri and Jairajpuri, 1974

Clarkus Jairajpuri, 1970

Coomansus Jairajpuri and Khan, 1977

Judonchulus Andrássy, 1958

Nigronchus Siddiqi, 1984

Paramononchus Mulvey, 1978

Prionchulus Cobb, 1916

Sporonchulus (Cobb, 1917) (Mohandas and Prabhoo, 1982) Andrássy, 1993

Malnadus N.Gen.

GENUS *MONONCHUS* BASTIAN, 1865

Bastian (1865) proposed the genus ***Mononchus*** with subgenera ***Mononchus, Mylonchulus, Anatonchus*** and ***Sporonchulus***. ***Prionchulus*** (Cobb, 1916) Wu and Hoeppli, 1929 also was added to the subgenera later on. All the subgenera were raised to generic rank by different workers at different periods. ***Mononchus truncatus*** Bastian, 1865 was proposed as its type species. Cobb (1893), Skwarra (1921) and Schneider (1921) were the early workers after Bastian, who reported 3 more species under this genus. Many species of ***Mononchus*** were transferred to other genera later by various workers. Jairajpuri (1970) provided a key for the identification of species of ***Mononchus***. Andrássy (1993) while making a taxonomic survey of the group updated the classification of the genus. He (l.c.) recognised 14 species including a new species. In the present study, soil samples from different localities of Malnad tracts yielded two new and a known species of ***Mononchus*** which are described and illustrated.

Diagnosis : (After Andrássy, 1993). Body size varies between 1 to 6 mm. Buccal cavity oval, longer than wide, armed with a well developed dorsal tooth lying in the anterior third to sixth of stoma and pointed forward Each subventral wall opposite to dorsal tooth shows a thin transverse rib. A short and weak longitudinal rib may or may not be present in the anterior third of buccal cavity. Oesophago-intestinal junction non-tuberculate. Female reproductive system amphidelphic, rarely opisthodelphic, vulva more or less equatorial, located at about 46 to 62% of body. Spicules long and slender Supplementary papillae 10 - 47. Tails short and obtuse or elongate, cylindroid, about 1.2 - 1.8 anal body diameters long, similar in sexes. Caudal glands and spinneret distinct.

Type species :

Mononchus truncatus Bastian, 1865

Other species :

There are some sixteen species including the following recent additions and new species:

M. pulcher Andrássy, 1993

M. oryzae n.sp.

M. piperae n.sp.

For the list, refer Andrássy (1993).

MONONCHUS TUNBRIDGENSIS BASTIAN, 1865

Measruements :

Females (n = 7) : L = 1.2 - 1.4 (1.2 ± 0.1) mm a = 28 - 30 (28.4 ± 1 7);

b = 3 8 - 5 1 (4 9 ± 0 2), c = 8 3 - 10 8 (10.3 ± 1 4), c' = 4 1 - 7 (4 7 ± 0 5), V = 50 - 59 (54 ± 3), G1 = 16 6 - 14 5 (12 4 ± 1 4), G2 = 9 4 - 13 9 (13 ± 0 8), oesophagus = 242 - 352 (248 5 ± 10) um, buccal cavity length 18 - 21 um, buccal cavity width 8 - 9 um, position of dorsal tooth from base 75 - 91%, tail 107 - 161 (120 ± 8) um, ABD 33 - 34 um

Male : Not found

Habitat and locality : Soil around roots of cardamom plants (***Elettaria cardamomum***) from Narasimharajapura, Shimoga Distt

Remarks : The present specimens conform well with ***Mononchus tunbridgensis*** Bastian, 1865 except in having slightly higher 'V' value and in the position of dorsal tooth from base (V = 51 - 55, dorsal tooth 70 - 75% from base in ***M. tunbridgensis***)

MONONCHUS ORYZAE N.SP.

(Fig 33)

Measurements :

Holotype female : L = 2 0 mm, a = 35 2, b = 4, c = 8 9, c' = 6, V = 58, G1= 10 5, G2 = 9 4, oesophagus 512 um, buccal cavity length 46 um, buccal cavity width 21 um, tail 229 um, ABD 38 um

Paratype females (n = 6) : L = 1 7 - 2 1 (1 8 ± 0 2) mm, a = 29 3 - 35 2 (32 1 ± 2 6), 3 7 - 4 2 (3 9 ± 0 2), c = 8 - 10 (8 8 ± 0 8), c' = 5 2 - 6 5 (5 9 ± 0 5), V = 55 3 - 58 7 (57 ± 1 8), G1 = 10 - 11 5, G2 = 9 4 - 13 2, oesophagus 436 - 512 um, buccal cavity length 40 - 46 um, buccal cavity width 18 - 21 um, tail 176 - 229 (208 ± 26) um; ABD 34 - 38 um

Description:

Female : Large nematodes Body almost striaght upon fixation Cuticle about 1 - 3 mm thick at various regions of the body Lip continuous, 23 - 28 um wide, 6 - 8 um high Amphids located above level of dorsal tooth apex or just at level of base of lip region Buccal cavity 40 - 46 um long, 18 - 21 um wide Subventral walls show a thin transverse rib opposite to dorsal tooth A short longitudinal rib also present on anterior one-third of subventral wall just above level of dorsal tooth apex Dorsal tooth big, situated at anterior half of buccal cavity, its apex 24 - 31 um or 71 - 74% from base of buccal cavity Base of buccal cavity conical in shape Oeosphagus strongly muscular Nerve ring situated at 127 - 148 um from anterior end Excretory system not seen Hemizonid present below nerve ring

Reproductive system amphidelphic Vulva sclerotized, opening pore-like Sphincter present at oviduct-uterus junction Oviduct broad at the proximal end Oocytes arranged in a single row except at tip Tail conoid, then tapering to a long cylindroid structure with a slightly clavate tip Caudal glands present Spinneret and caudal opening terminal

Male : Not found

Type habitat and locality : Soil arond roots of paddy (***Oryza sativa***) from Aldur zone, Chikmagalur Distt

Type material : Collected in July 1993 Holotype female on slide ***Mononchus oryzae*** n sp /1 and paratype females on slides ***Mononchus oryzae*** n sp /2-4

Relationship : ***Mononchus oryzae*** n sp closely resembles ***M. truncatus*** Bastian, 1865 in its general morphology It distinctly differs from it in having

a short longitudinal ridge on the subventral wall opposite dorsal tooth apex, anteriorly placed amphids, in lip width and height, shorter tail, position of dorsal tooth apex, ratio between buccal cavity length and width and pore-like vulva (short longitudinal ridge opposite to dorsal tooth apex absent, amphids located at the level of dorsal tooth apex, dorsal tooth apex at 74 - 77% from base; lip width 28 um, lip height 10 um; ratio between buccal cavity length and width 2 4 vs 2 1 - 2.3 and vulva transverse in ***M. truncatus***). It also comes closer to ***M. pulcher*** Andrássy, 1993 in the presence of a short longitudinal ridge opposite dorsal tooth apex and in the position of amphids, but distinctly differs from it in having larger buccal cavity, in the position of dorsal tooth apex from base and pore-like vulva (buccal cavity length 35 - 38 um, buccal cavity width 16 - 18 um; dorsal tooth apex at 78 - 80% from base, vulva strongly sclerotized and vagina spotted in ***M. pulcher*** Andrássy, 1993) Further, it can be compared with ***M. sinensis*** Soni and Nama, 1983 in the presence of a short longitudinal ridge opposite dorsal tooth apex and in the position of amphids. It distinctly differs from the above in having sclerotized vulva greater a value, longer oesophagus , position of vulva, smaller lip region, buccal cavity and position of dorsal tooth apex from base (vulva not sclerotized; a = 32-38; oesophagus 335-375 um; V = 47 - 50; lip region 20 - 22 um wide; buccal cavity length 29 - 33 um; buccal cavity width 15 - 16 um and dorsal tooth apex at 77 - 80% from base in ***M. sinensis***).

MONONCHUS PIPERAE N.SP.

(Fig. 33)

Measurements :

Holotype female : L = 1.5 mm; a = 33.7; b = 4.3; c = 7.0; c' = 6.6; V = 51, G1 = 9.2; G2 = 9.4; oesophagus 346 um; buccal cavity length 35 um, baccal cavity width 15 um;tail 213 um; ABD 32 um.

Paratype females (n = 6) : L = 1.3 - 2 (1.6 ± 0.3) mm; a = 29.2 - 38.8 (33.6 ± 3.9); b = 3.8 - 5.1 (4.3 ± 0.6); c = 7.5 - 8.3 (7.7 ± 0.4), c' = 6.1 - 8.1; V = 43-53 (49 ± 5.5); G1 = 8.4-11.3; G2 = 9 4-11; oesophagus 352-375 um; buccal cavity length 34-37 um; buccal cavity width 15-16 um; tail 161-260 (206 ± 41) um; ABD 32 - 34 um.

Description:

Female : Medium-sized nematodes. Body almost straight upon fixation. Lip continuous, truncated, narrower than adjoining body width, 21 - 23 um wide, 6 um high. Amphids located just below lip base or anterior to dorsal tooth apex. Buccal cavity 34 - 37 um long, 15 - 16 um wide. Dorsal tooth medium-sized. Apex of dorsal tooth situated at 24 - 25 um or 65 - 70% from base of buccal cavity. Subventral walls without short longitudinal ridge opposite dorsal tooth apex. Small transverse ridge present at level of dorsal tooth apex. Excretory system absent. Nerve ring situated at 104 -119 um from anterior end.

Female reproductive system amphidelphic. Vulva pore-like, sclerotized. Vagina cylindroid. Sphincter present at oviduct-uterus junction. Uterus short Oviduct broad at proximal end. Oocytes arranged in a single row except at

tip. Tail conoid, then tapering to a long cylindroid structure with a slightly clavate tip. Caudal glands present. Caudal opening and spinneret terminal.

Male : Not found.

Type habitat and locality : Soil around roots of pepper plants (***Piper nigrum***) from Chikmagalur.

Type material : Collected in August 1993. Holotype female on slide ***Mononchus piperae*** n.sp./1 and paratype females on slides ***Mononchus piperae*** n.sp./2-4.

Relationship : ***Mononchus piperae*** n.sp. closely resembles ***M. truncatus*** Bastian, 1865, ***M. aquaticus*** Coetzee, 1968, ***M. pulcher*** Andrássy, 1993 and ***M. sinensis*** Soni and Nama, 1983. From ***M. truncatus*** it differs in having smaller body; shorter tail; narrower lip region; anteriorly located amphids; narrower buccal cavity, in position of dorsal tooth apex from base and the structure of vulva (L = 1.65 - 2.14 mm; tail 249 - 283 um; lip region 28 um wide, 10 um high; amphids at the level of dorsal tooth apex; buccal cavity length 46 um; buccal cavity width 19 um; dorsal tooth apex at 74-77% from base and vulva a transverse slit in ***M. truncatus***). From ***M. aquaticus*** it distinctly differs in having shorter tail, greater 'c' value, position of vulva, larger buccal cavity, position of dorsal tooth apex, ratio of buccal cavity length to width; absence of excretory system and in the structure of vulva (tail = 94 - 156 um; c = 9 - 15; V = 49 - 52; buccal cavity 29 - 31 um long and 14 - 16 um wide; ratio of buccal cavity length to width 2.4 - 2.5 vs 2.2 - 2.4; dorsal tooth apex at 77 - 81% from base; excretory system present and vulva transverse in ***M. aquaticus***). Further, it also differs from ***M. pulcher***

Andrássy, 1993 in the absence of short longitudinal ridge on the subventral wall opposite dorsal tooth apex, lesser 'c' value, position of dorsal tooth and in the structure of vulva (short longitudinal ridge present; c = 9.2 - 9.7; dorsal tooth apex at 78-80% from base of buccal cavity and vulva transverse in ***M. pulcher***). It can also be differentiated from ***M. sinensis*** in the absence of short longitudinal ridge on the subventral wall opposite dorsal tooth apex; presence of sclerotized vulva, longer buccal cavity and position of dorsal tooth (short longitudinal ridge present; vulva not sclerotized, buccal cavity 29 - 33 um long, 15 - 16 um wide and dorsal tooth apex at 77 - 80% from base in ***M. sinensis***).

GENUS *MALNADUS* N.GEN.

In the present course of study a female specimen collected from one of the soil samples of Malnad tracts showed characters resembling ***Mononchus*** Bastian, 1865; ***Coomansus*** Jairajpuri and Khan, 1982 and ***Nigronchus*** Siddiqi, 1984. On detailed study, it was found to be a new genus. The name ***Malnadus malnadi*** n.gen., n.sp is proposed for its reception. The new genus is placed under the subfamily Mononchinae owing to the presence of slightly anteriorly located dorsal tooth and subventral walls without transverse denticles and mono-prodelphic gonads.

Diagnosis : Non-tuberculate. Body small-sized, strongly ventrally curved upon fixation. Lip region slightly set off. Dorsal tooth almost in the middle portion of buccal cavity, its apex situated slightly above mid region. Subventral tooth or denticles or longitudinal ridges absent. Amphids post-labial, small. Excretory pore present. Female reproductive system mono-prodelphic. Vulva pore-like, sclerotized. Caudal glands, opening and spinneret absent. Tail short, bluntly rounded.

Type and only species :

Malnadus malnadi n.sp.

Relationship : ***Malnadus*** n.gen. closely resembles ***Mononchus*** Bastian, 1865; ***Coomansus*** Jairajpuri and Khan, 1982 and ***Nigronchus*** Siddiqi, 1984. From ***Mononchus*** it clearly differs in the postion of dorsal tooth, mono-prodelphic gonads, short, bluntly rounded tail, absence of caudal glands, opening and spinneret (dorsal tooth anteriorly located; female

reproductive system amphidelphic; tail long, cylindroid and then clavate at tip; caudal glands, opening and spinneret present in ***Mononchus***). Further, from ***Coomansus*** it differs in the absence of longitudinal ridge on the subventral walls of the buccal cavity, tail shape and mono-prodelphic gonad (thin longitudinal ridge present, tail elongate-conoid and female reproductive system amphidelphic in ***Coomansus***). From ***Nigronchus*** it differs in the position of dorsal tooth, shape of lip region and buccal cavity, posteriorly located vulva, tail size and absence of caudal glands (dorsal tooth at the anterior fourth of stoma; lip region wider than adjoining body by sharp constriction; V 52-56%; caudal glands consipicuous and tail elongate filiform, about 7 anal body widths long in ***Nigronchus***).

MALNADUS MALNADI N.SP.

(Fig. 34)

Measurements :

Holotype female : L = 0.8 mm; a = 2 1.2; b = 3.0; c = 27.5; c' = 1 3, V = 74.5, G1 = 11; oesophagus 283 um; buccal cavity length 31 um; buccal cavity width 16 um; tail 32 um; ABD 23 um.

Description:

Female : Small-sized nematode, about 0.8 mm. Strongly ventrally curved upon fixation. Cuticle thin, inner cuticle somewhat loose. Lip region slightly set off by depression, 26 um wide and 6 um high. Amphids distinct, located above the level of dorsal tooth apex. Buccal cavity 31 um long and 16 um wide. Dorsal tooth moderate, located at the middle of buccal cavity, its apex

situated at 58% from base. Subventral wall without tooth, denticles or longitudinal ridge Oesophagus muscular Oesophago-intestinal junction non-tuberculate. Excretory pore located at 107 um from anterior end Nerve ring at 98 um from anterior end.

Female reproductive system mono-prodelphic Vulva nearly at posterior three-fourths, pore-like, sclerotized. Cuticular pieces at vulva-vagina junction spherical, little inside body. Vagina simple, inclined anteriad Posterior-uterine branch absent. Ovary poorly developed. Uterus, a short glandular structure. Rectum more than one anal body widths long. Tail short, slightly more than anal body width, bluntly rounded. Caudal glands, opening and spinneret absent.

Male : Not found.

Type locality and habitat : Soil around roots of coffee plants (***Coffea arabica***) from Cooverkolly Estate, Coorg Distt.

Type material : Collected in September 1993. Holotype female on slide ***Malnadus malnadi*** n.gen., n.sp./1.

GENUS *CLARKUS* JAIRAJPURI, 1970

Jairajpuri (1970) established the genus ***Clarkus*** to accommodate those species of ***Mononchus*** Bastian, 1865 which were characterized by a barrel-shaped buccal cavity, with a non-denticulate ventral ridge, dorsal tooth in the anterior half of stoma, non-tuberculate oeosophago-intestinal junction, amphidelphic gonads and short, conoid, arcuate tails in both sexes. *C. papillatus* (Bastian, 1865) was proposed as its type species. Initially, ***Clarkus*** was placed under the subfamily Prionchulinae. But Andrássy (1993) placed it under Mononchinae. Jairajpuri (1970) transferred 3 species of ***Mononchus*** to this genus. Jairajpuri and Khan (1977, 1982) synonymised two species of ***Mononchus*** with ***Clarkus***. Andrássy (1983, 1985) and Yeates (1992) added 3 more species. At present there are some 9 valid species reported for this genus. In the present study, a known species that was found in the soil samples of Malnad tracts is reported. It was observed that ***Clarkus*** is widely spread in this area, since almost 50% of the soil samples collected yielded this genus.

Diagnosis : (After Andrássy, 1993). Body medium-sized. Buccal cavity barrel-shaped, nearly twice as long as wide. Dorsal tooth large, anteriorly located, apex in the first fifth to third of buccal cavity. Ventral wall bears a moderately developed longitudinal ridge abruptly originated opposite to the dorsal tooth by a pointed, somewhat tooth-like terminus. Oesophago-intestinal junction non-tuberculate. Posterior wall of oesophagus with pearl-like structure.Female reproductive system amphidelphic,

vulva at 45-69% of body length. Males not common, if occur, provided with 10 - 19 supplements. Spicules short. Tails of both sexes similar; short, conoid, ventrally arcuate, 1.5 - 6 anal body widths long. Caudal glands rudimentary, caudal opening absent.

Type species :

Clarkus papillatus (Bastian, 1865), Jairajpuri, 1970.

Other species :

C. diversus Andrássy, 1983

C. dorsalis Yeates, 1992

C. elongatus Jairajpuri and Khan, 1977

C. macropapillatus (Mulvey, 1967) Jairajpuri, 1970

C. propapillatus (Clark, 1960) Jairajpuri, 1970

C. pulcherrimus Andrássy, 1985

C. sheri (Mulvey, 1967) Jairajpuri, 1970

C. sveltus (Altherr, 1968) Jairajpuri and Khan, 1982

CLARKUS SHERI (MULVEY, 1967) JAIRAJPURI, 1970

Measurements :

Females (n = 15) : L = 2 - 2.5 (2.1 ± 0.2) mm; a = 30 - 37.7 (33.6 ± 2.4); b = 3.9 - 4.7 (4.2 ± 0.3); c = 15.4 - 19.5 (17.3 ± 1.5); c' = 2.8 - 3.2 (2.9 ± 0.2); V = 59 - 70 (63.5 ± 3.9); G1 = 8 - 12; G2 = 8 - 13; oesophagus 416 - 552 (506 ± 26) um; buccal cavity length 40 - 43 um; buccal cavity width 21 - 24.5 um; dorsal tooth apex from base 20 - 21 um or 70 - 79%; nerve ring 138 - 168 um; tail 104 - 130 um; ABD 40 - 44 um.

Male : Not found.

Habitat and locality : Soil around roots of coconut trees from Hirur, Chikmagalur Distt.

Remarks : The present specimens conform well with the description of ***Clarkus sheri*** (Mulvey, 1967) Jairajpuri, 1970 except in having slightly more a, V values, smaller buccal cavity and in the location of dorsal tooth (a = 24- 30; V = 59 - 63; buccal cavity length 34 - 38 um; buccal cavity width 18 um and dorsal tooth apex from the base 70 - 73% in the type material).

GENUS *SPORONCHULUS* COBB, 1917

Cobb (1917) established the genus ***Sporonchulus*** as a subgenus of ***Mononchus*** which was later on raised to generic rank by Pennak (1953). Jairajpuri placed this genus under the subfamily Sporonchulinae, but Andrássy (1993) regarded it under Mononchinae. He (l.c.) synonymised ***Sporonchuloides*** Mohandas and Prabhoo, 1982 with ***Sporonchulus***. Cobb's (1917) ***Sporonchulus dentatus*** was regarded as its type species. Andrássy (1958) synonymised some species of ***Mononchus*** and ***Sporonchuloides*** with this genus. ***S. vagabundus*** was reported by Jairajpuri, (1971). At present, there are 4 valid species under this genus. In the present study, a known species collected from Malnad is reported.

Diagnosis : (After Andrássy, 1993). Moderate-sized nematodes. Buccal cavity barrel-shaped. Dorsal tooth moderately large, situated in the anterior half of the stoma, pointed forward. Subventral walls with numerous denticles arranged in four irregular longitudinal rows. Oesophago-intestinal junction non-tuberculate. Female reproductive system amphidelphic or mono-prodelphic. Vulva usually, slightly post-equatorial, situated at 55-65% of total body length. Males not common. One species with males having 12 ventromedian supplements. Tails of both sexes similar, ventrally arcuate, conoid, short, 1.5 - 2.5 anal body widths long. Caudal glands and terminal opening normal or reduced.

Type species :

Sporonchulus dentatus Cobb, 1917

Other species :

S. coronatus (Carvalho, 1956) Andrássy, 1958

S. ibitensis (Carvalho, 1951) Andrássy, 1958

S. vagabundus Jairajpuri, 1971

SPORONCHULUS IBITENSIS (CARVALHO, 1951) ANDRÁSSY, 1958

Measurements :

Females (n = 8) : L = 1.0 - 1.3 mm; a = 23.9-33.4 (28 ± 4.3); b = 3.8- 4.5 (4.1 ± 0.3); c = 21.2-26.7 (23.5 ± 2.2); c' = 1.5-1.9 (1.7±0.2); V = 58 - 63.6 (60 ± 2); G1 = 7 - 13; G2 = 7 - 12; oesophagus 283 - 352 um; buccal cavity length 26 - 31 um; buccal cavity width 14.5 - 19 um; dorsal tooth from base 63 - 75%; rectum 24.5 - 27.5 um; tail 47 - 61 um; ABD 26 - 37 um.

Male : Not found.

Habitat and locality : Soil around roots of robusta coffee (*Coffea canephora*) from Kalasa, Chikmagalur Distt.

Remarks : The present specimens conform well with the description of *S. ibitensis* (Carvalho, 1951) Andrássy, 1958 except in the location of dorsal tooth, c' value and size of denticles (dorsal tooth apex at 74 - 80% from the base of buccal cavity; c' = 2.5 and denticles large in *S. ibitensis*).

SUBFAMILY COBBONCHINAE JAIRAJPURI, 1969

Diagnosis : (After Andrássy, 1993). This subfamily comprises nematodes with both dorsal and subventral walls armed with teeth almost of equal size. Apex of the teeth pointing forwards. Usually the dorsal tooth is located in the anterior half of buccal cavity while the subventral teeth are at the posterior half. In rare cases, all the three teeth be at the same level in mid-stoma.

Type genus :

Cobbonchus Andrássy, 1958

Other genus :

Comiconchus Jairajpuri and Khan, 1982

GENUS *COBBONCHUS* ANDRÁSSY, 1958

The genus *Cobbonchus* was established by Andrássy (1958) for those species of *Mononchus* Bastian, 1865 with dorsal tooth in anterior half of stoma opposed by almost equally developed but posteriorly located subventral teeth. He (l.c.) transferred Cobb's (1917) species *Mononchus palustris* to *Cobbonchus* and proposed it as the type species. Jairajpuri and Khan (1982) recognised only 15 species. Andrássy (1993) listed all the later additions and recognised 27 valid species in the genus. He (l.c.) transferred Carvalho's (1956) species of *Mononchus* and *Miconchus* to *Cobbonchus*. He reduced Cobbonchidae Jairajpuri, 1969 to subfamilial rank. Coetzee (1965, 1966, 1968) reported 7 species of *Cobbonchus*. In the present study, soil samples collected from different areas of Malnad tracts yielded 3 new species of the genus *Cobbonchus*, which are described and illustrated.

Diagnosis : (Emended). Small to medium-sized nematodes. Buccal cavity oblong, armed with a large dorsal tooth and two slightly smaller subventral teeth. Dorsal tooth located in anterior half of buccal cavity while subventral teeth located in posterior half. Oesophago-intestinal junction non-tuberculate. Female reproductive system amphidelphic or in few species prodelphic. Vulva equatorial to post - equatorial, located at 49 - 80% of body length from the anterior end. Vulval papillae may or may not be present. Males common Ventromedian supplements 6 - 18 in number, gubernaculam present. Spicules bulky. Tails in both sexes similar; short, 0.5 - 2.3 anal body widths long, conoid to digitate or blunt, ventrally arcuate. Caudal glands and terminal orifice distinct.

Type species :

Cobbonchus palustris (Cobb, 1917) Andrássy, 1958

Other species :

There are some 29 species including the following recent additions and new species, viz;

C. ***altitudinarum*** Yeates, 1992

C. ***couleensis*** Yeates, 1992

C. ***dzumaci*** Yeates, 1992

C. ***inclinatus*** n.sp.

C. ***papillatus*** n.sp.

C. ***citri*** n.sp.

COBBONCHUS INCLINATUS N.SP.

(Fig. 34)

Measurements :

Holotype female : L = 1.4 mm; a = 49.6 ; b = 3.5 ; c = 53.7 ; c' = 1.2;

V = 63 7, G1 = 12 , G2 = 11 5 , oesophagus 412 um, buccal cavity length 28 um, buccal cavity width 15 um, rectum 22 um, tail 26 5 um, ABD 22um

Paratype females (n = 11) : L = 1 3 - 1 6 (1 5 ± 0 2) mm, a = 34 9 - 47 6 (42 7 ± 6 9), b = 2 9 - 3 7 (3 3 ± 0 4), c = 34 9 - 53 7 (40 ± 7), c' = 1 2-1 6 (1 5 ± 0 1), V = 63-78 (69 ± 8), G1 = 12-17, G2= 12 - 17, oesophagus 412 - 466 (452 ± 22 5) um, buccal cavity length 29 - 34 um, buccal cavity width 14 5-17 um, rectum 21-29 um, tail 34-43 (38 ± 4 6) um, ABD 21 - 27 5 um

Description :

Female : Body ventrally arcuate upon fixation, often 'J' shaped Lip region set off by expansion, 24-26 um wide, 6-8 mm high Amphids small, stirrup- shaped, located at base of lip region Buccal cavity twice as long as wide, 29 - 34 um long, 14 5 - 17 um wide, base funnel - shaped Dorsal tooth moderate, situated at the base of anterior half of the stoma, apex at 67 - 74% from base Subventral teeth slightly below the level of dorsal tooth Slight indentation on the subventral wall opposite to dorsal tooth apex observed Oesophagus muscular Oesophago - intestinal junction non - tuberenlate Nerve ring at 107 - 116 um from anterior end Excretory system not observed

Female reproductive system amphidelphic, both the branches developed equally Vulva post - equatorial, transverse, sclerotized Vagina narrow, inclined anteriad with an angular bend. Sphincter band present on the vaginal walls Vulval papillae absent Uterus convoluted Well developed sphincter present at oviduct - uterus junction. Oviduct broad at the proximal

end. Tail conoid, then cylindroid, ends in a peg - like tip. Caudal glands tandem. Caudal opening and spinneret terminal.

Male : Not found.

Type habital and locality : Soil around roots of shade trees (unidentified) from Hosakode Estate, Kadavanthi.

Type material : Collected in June, 1993. Hototype female on slide ***Cobbonchus inclinatus*** n.sp./1 and paratype females on slides ***Cobbonchus inclinatus*** n.sp./2-4.

Relationship : ***Cobbonchus inclinatus*** n.sp. differs from all the other species of the genus in the presence of uniquely bent vagina. It closely resembles *C.* ***mauritianus*** (Williams, 1958) Clark, 1960 in general morphology but distinctly differs in having larger body, greater tail length, c value, wider lip region, posteriorly located dorsal tooth and in having inclined vagina. (L = 1.1 - 1.3 mm; tail 32.5 mm; c = 24 - 4; c' = 1.4 ; lip region 20 um wide; apex of the dorsal tooth at 76% from base and vagina not bent in *C.* ***mauritianus***).

COBBONCHUS PAPILLATUS N.SP.

(Fig. 35)

Measurements :

Holotype females : L = 1.6 mm; a = 42.4; b = 3.7; c = 50.5; c' = 1.1; V = 66.5; G1 = 17; G2 = 15; oesophgaus 426 um; buccal cavity length 35 um; buccal cavity width 18 um; rectum 28 um; tail 31 um; ABD 29 um.

Paratype females (n = 9) : L=1.6-2.3 (2±0.2) mm; a =39.4-57.7 (50.2 ±7); b = 2.7 - 3.5 (3.3 ± 0.2); c = 44.3 - 68.7 (53.8±7.4); c' = 1.1-1.9 (1.5 ± 0.3);

V = 62 - 73 (66 ± 3 4); G1 = 5 - 14, G2 = 6 - 17, oesophagus 489 - 696 (615 ± 82) um; buccal cavity length 34 - 47 um; buccal cavity width 17 - 20 um, rectum 27.5 - 31 um, tail 24.5 - 46 (38 4 ± 7.4) um ABD 20 - 31 (25 6 ± 2.9) um

Paratype males (n = 3) : L = 1 4 - 1 5 mm, a = 42 7 - 50, b = 3 3 - 3 5, c = 40 8 - 62 8, c' = 1 - 1.3, T = 51 - 54; spicule 41 - 51.5 um; gubernaculum 15 um, lateral accessory pieces 13 - 15 um, ventromedian supplements 7, oesophagus 413 - 447 um, buccal cavity length 28 - 32 um, buccal cavity width 15 um; rectum 26 5 - 31 um, tail 23 - 35 um, ABD 18 - 31 um

Description :

Female : Body usually **'J'** shaped upon fixation, rarely ventrally arcuate Lip region set off by expansion, 26 - 32 um wide, 6 - 14 um high. Cuticle thin, almost uniform throughout the body Amphids distinct, stirrup-shaped, apertures slit-like, 3 - 6 um wide, located at 8 - 14 um from anterior end or at the base of lip region Buccal cavity almost twice as long as wide, 34-47um long, 17 - 20 um wide. Dorsal tooth moderately large, situated at the base of anterior half of the stoma, apex at 21 - 27.5 um or 58 - 65% base Subventral walls bear two teeth slightly smaller, situated below the level of dorsal tooth Slight indentation present on the subventral wall opposite to dorsal tooth Base of the buccal cavity funnel-shaped. Oesophago-intestinal junction non-tubereulate Oesophagus muscular Nerve ring at 107 - 136 um from anterior end. Excretory system not observed.

Reproductive system amphidelphic. Both the gonads equally developed Vulva transverse, sclerotized. Three pre-vulval and four

post-vulval papillae distinct. Vagina with sphincter muscular band at the mid-portion. Uterus convoluted, sperms observed. Well developed sphincter present at oviduct-uterus junction. Oocytes arranged in a single row except at tip. Proximal part of the oviduct broad. Tail conoid, then project like finger, 1.2 - 1.9 anal body widths long. Caudal glands tandem. Sphinneret and caudal opening terminal.

Male : Similar to females except in having comparatively smaller body. Testes paired, outstretched. Spicules ventrally arcuate, 41 - 51.5 um long medially. Lateral accessory pieces simple, 13 - 15 um, bifurcated at tip. Gubernaculum complex, 15 um long. Supplements 7 in number. Tail 1 - 1.3 analbody widths long. Caudal glands tandem. Spinneret and caudal opening terminal.

Type habitat and locality : Soil around roots of forest trees (unidentified) near Aldur Chikmagalur Distt.

Type material : Collected during July, 1993. Holotype female on slide ***Cobbonchus papillatus*** n.sp./1 and paratype females and males on slides ***Cobbonchus papillatus*** n.sp./2-4.

Relationship : ***Cobbonchus papillatus*** n.sp. is different from the other species of the genus in having distinct vulval papillae. It closely resembles *C. **paraindicus*** Rahman and Jairajpuri, 1983 in having vulval papillae but distinctly differs in the general body size, spicule size, number of ventromedian supplements, lip width, buccal cavity size, position of dorsal tooth apex and structure of the tail (L = 1 - 1.2 mm; a = 25 - 26; b = 3 - 3.2; c = 45 - 50; c' = 0.7; V = 64; T = 46; tail 21 - 27 um; spicule 58 um; gubernaculum 26 um;

lateral accessory pieces 11 um; ventromedian supplements 16, lip region 20 - 22 um wide, buccal cavity 19 - 28 x 14 um, dorsal tooth apex at 74 - 85% from base and tail more bulbous and short in *C. paraindicus*)

COBBONCHUS CITRI N.SP.

(Fig. 36)

Measurements :

Holotype female : L = 1 3 mm, a = 47.9; b = 3 4, c = 49 2, c' = 1 2, V = 65.5, G1 = 15; G2 = 15, oesophagus 382 um; buccal cavity length 25 um, buccal cavity width 15 um; rectum 21 um; tail 24.5 um, ABD 21 um

Paratype males (n = 2) : L = 1 1-1 3 um, a = 36 8-43 8, =3 3-3 4, c =41 7 - 45 4, c'=0.9-1.2, T=49-52 5; spicule 37-40 um, lateral accessory pieces 10-12 um; gubernaculum 15-16 um; supplements 6, oesophagus 346-375 um, buccal cavity length 25 um; buccal cavity width 15 um, rectum 23 5-24 um, tail 25-31 um, ABD 25-26.5 um

Description :

Female : Body moderate, ventrally arcuate upon fixation Lip set off by expansion, 21 um wide, 7 um high. Amphids stirrup-shaped, 4 um wide, situated above the level of dorsal tooth apex, fovea bell-shaped Buccal cavity nearly twice as long as wide, 25 um long, 15 um wide. Dorsal tooth moderate, situated at the base of anterior part of stoma, apex at 18 um or 67% from base. Subventral wall bears two teeth slightly smaller than dorsal tooth, situated in the lower half of the buccal cavity Oesophagus muscular. Oesophago-intestinal junction non-tuberculate. Excretory system observed. Nerve ring at 93 um from anterior end.

Reproductive system amphidelphic. Vulva post-equatorial, straight, less than half of body width deep, vagina narrow. Vulval lips slightly protruded. Uterus tubular, long. Well developed sphincter present at oviduct-uterus junction. Base of oviduct broad. Oocytes arranged in a single row, except at tip. Tail short, conoid, then ends in a peg-like projection, 1.2 anal body widths long. Caudal glands grouped. Caudal opening and spinneret subterminal dorsally.

Male : Similar to female in general morphology. Testes paired, outstretched. Spicules arcuate, 37 - 40 um long medially. Gubernaculum complex 15 - 16 um long. Lateral accessory pieces bifurcated at the tip, 12 um long. Supplements 6 in number. Tail 0.9 - 1.2 anal body widths long.

Type habitat and locality : Soil around roots of orange trees (***Citrus reticulata***) from Sathkudige Estate, Chikmagalur Distt.

Type material : Collected in March 1994. Holotype female on slide ***Cobbonchus citri*** n.sp./1 and paratype males on slides ***Cobbonchus citri*** n.sp./2-3.

Diagnosis : ***Cobbonchus citri*** n.sp. comes closer to *C. **indicus*** Baqri and Jairajpuri, 1978 and *C. **inclinatus*** n.sp. From *C. **indicus*** it distinctly differs in having greater 'a' value, longer spicule, gubernaculum, wider lip region, buccal cavity, posteriorly located dorsal tooth and in the structure of tail (a = 37-45; spicule 36 um; lip region 16 um; buccal cavity 22-23 x 9-11 um; dorsal tooth at 77-78% from base of buccal cavity and tail more bulbous in *C. **indicus***). Further, from *C. **inclinatus*** n.sp. it differs in having straight vagina, protruded vulval lips, shorter tail, lesser c, V values, narrower lip region, buccal cavity, location of dorsal tooth and in having males (vagina distintly inclined, vulval lips not protruding, tail 34 - 43 um; c = 40; lip width 26 um wide; buccal cavity 32 x 16 um; dorsal tooth at 71% from base and males absent in *C. **inclinatus***).

FAMILY MYLONCHULIDAE JAIRAJPURI, 1969

Diagnosis : (After Andrássy, 1992). Small to medium-sized nematodes, buccal cavity funnel-like, tapering posteriorly, dorsal tooth large, claw-like and apex always located at anterior end of stoma. Subventral walls bear rasp-like transverse denticles. Two small subventral teeth opposite to base of dorsal tooth usually present. Oesophagus non-tuberculate. Female reproductive system mono-prodelphic or amphidelphic. Males with slender arcuate spicules with or without lateral accessory pieces. Tails of variable shapes, similar in sexes. Caudal glands and spinneret conspicuous.

Type and only subfamily :

Mylonchulinae, Jairajpuri, 1969.

Remarks : Jairajpuri (1969) considered two subfamilies under the family Mylonchulidae viz., Mylonchulinae and Sporonchulinae. But recently Andrássy (1992) placed Sporonchulinae under Mononchidae owing to the presence of longitudinal rows of denticles. He considered only those species which are having transverse denticles under Mylonchulinae.

SUBFAMILY MYLONCHULINAE JAIRAJPURI, 1969

Diagnosis : (After Andrássy, 1992). Body small to medium-sized. Buccal cavity goblet or funnel-shaped. Dorsal tooth massive, claw-like, facing anteriad. Subventral walls with few to several rows of rasp-like transverse denticles. Subventral teeth may or may not be present. Female reproductive system mono-prodelphic or amphidelphic. Tails variable in structure, similar

in sexes. Caudal glands conspicuous, grouped or tandem. Spinneret present, either terminal or subterminal.

Type genus :

Mylonchulus Cobb, 1916

Other genera :

Brachonchulus Andrássy, 1958

Granonchulus Andrássy, 1958

Margaronchulus Andrássy, 1972

Megaonchulus Jairajpuri and Khan, 1982

Oligonchulus Andrássy, 1976

Polyonchulus Mulvey and Jensen, 1967.

Remarks : Jairajpuri and Khan (1982) did not recognise ***Granonchulus*** Andrássy, 1958 and ***Brachonchulus*** Andrássy, 1958 under Mylonchulinae but Andrássy (1992) recognised them under Mylonchulinae. He (l.c.) also synonymised ***Paramylonchulus*** Jairajpuri and Khan, 1982 and ***Pakmylonchulus*** Khan and Saeed, 1987 with ***Mylonchulus***.

GENUS *MYLONCHULUS* (COBB, 1916) ALTHER, 1953

Cobb (1916) erected the genus ***Mylonchulus*** as a subgenus of ***Mononchus*** which was later on declared as a separate genus by Altherr (1953). ***Mylonchulus minor*** (Cobb, 1916) Andrássy, 1958 was proposed as the type species. Jairajpuri and Khan (1982) recognised only 33 species reported by various workers up to that period. Several new additions were made afterwards. Andrássy (1992) synonymised ***Paramylonchulus*** Jairajpuri

and Khan, 1982 with ***Mylonchulus*** and transferred all the species of ***Paramylonchulus*** to ***Mylonchulus***. He (l.c.) listed 56 valid species including several synonymisation and new species. In the present study, Andrássy's (1992) synonymisation of ***Paramylonchulus*** Jairajpuri and Khan, 1982 was accepted because, presence of monodelphic gonads within the species of a genus is a commonly occurring phenomenon. Three known species collected from the Malnad tracts are reported in the the present work.

Type species :

Mylonchulus minor (Cobb, 1916) Andrássy, 1958

Other species :

There are some 59 species including the recent additions, viz.,

M. inflatus Loof, 1993

M. gigas Gagarin, 1993

M. esculentus Jain, Saxena and Sharma, 1993

For the list please refer to Andrássy (1992).

MYLONCHULUS HAWAIIENSIS (CASSIDY, 1931) ANDRÁSSY, 1958

Measurements :

Females (n = 7) : L = 1 - 1.4 (1.2 ± 0.2) mm; a = 23.7 - 30.4 (27.8 ± 2.7); b = 3.1 - 3.7 (3.5 ± 0.3); c = 27 - 29.5 (27.9 ± 1.0); c' = 1.4 - 1.7; V = 58 - 61 (59.5 ± 1.1); G1 = 7 - 9; G2 = 7 - 11; oesophagus 298 - 379 (340±29) um; buccal cavity length 26-29 um; buccal cavity width 15-18 um; dorsal tooth apex from base 66-78%; nerve ring 93-113 um; rectum 23-26 um; tail 35 - 49 (42 ± 6) um; ABD 21 - 34 (27.2 ± 5) um.

Male : Not found.

Habitat and locality : Soil around roots of tree coffee plants (***Coffea excelsa***) from CRS farm, Chikmagalur Distt.

Remarks : The present specimens conform well with the description of ***M. hawaiiensis*** (Cassidy, 1931) Andrássy, 1958 except in having slightly longer tail and longer buccal cavity (tail 30 - 40 um; buccal cavity 22 - 25 x 14 - 17 um in ***M. hawaiiensis***).

MYLONCHULUS CONTRACTUS JAIRAJPURI, 1970

Measurements :

Females (n = 6) : L = 0.7 - 0.9 (0.8 ± 0.1) mm; a = 23.5 - 28.6 (25.9 ± 2.1); b = 2.8 - 3.3 (3.0 ± 0.3); c = 20.3 - 27.2 (26.1 ± 4.5); c' = 1.4 - 1.8 (1.6 ± 0.2); V = 59 - 67 (61.5 ± 3); G1 = 7 - 10; G2 = 8 - 10; oesophagus 260 - 275 (271 ± 8) um; buccal cavity length 18 um; buccal cavity width 9 - 14 um; dorsal tooth apex from base 75 - 83%; nerve ring 73 - 89 um; rectum 20 - 23 um; tail 23 - 37 (31 ± 6) um; ABD 17 - 20 um.

Male : Not found.

Habitat and locality : Soil around roots of cardamom plants (***Elettaria cardamomum***) from Green field Estate, Kodagu Distt. Karnataka state.

Remarks : The present specimens conform well with the original description of ***M. contractus*** Jairajpuri, 1970 except in having longer tail, more c value, posteriorly located nerve ring and in the absence of males (tail 15 - 22 um; c = 30 - 40; nerve ring 60 - 76 um and males present in the type material).

MYLONCHULUS MULVEYI JAIRAJPURI, 1970

Measurements :

Females (n = 5) : L = 0.9-1.1 mm; a = 35.6-40.7 (38.7±2.7); b = 3.1 - 3.5) (3.3 ± 0.2); c = 35.2 -48.9 (42 .8 ± 7); c' = 2.1 - 2.4; V = 74 - 79 (76 ± 3), G1 = 14 - 18 (15.7 ± 2); oesophagus 291 - 321 (306 ± 15) um; buccal cavity length 16 - 19 um; buccal cavity width 10 - 11 um; dorsal tooth apex from base 76 - 88%; nerve ring 84 - 95 um; rectum 18 um; tail 35 - 49 (42 8 ± 7) um; ABD 23 - 26 um.

Male : Not found.

Habitat and locality : Soil around roots of cardamom plants ***(Elettaria cardamomum)*** from Nethrakonda Estate. Chikmagalur Distt.

Remarks : The present specimens conform well with the original description of ***M. mulveyi*** Jairajpuri, 1970 except in having narrow lip region and sphincter muscles at oviduct-uterus junction (lip region 16 - 20 x 7 - 9 um vs 15 - 16.5 x 4 - 5 and sphincter absent at oviduct - uterus junction in the type material).

FAMILY ANATONCHIDAE JAIRAJPURI, 1969

Diagnosis : (After Andrássy, 1993). Medium to large-sized nematodes, ranging upto 6 mm. Buccal cavity strongly sclerotized, large, roomy and base flattened. Excepting ***Nullonchus*** Siddiqi, 1984, all the other genera possess dorsal tooth, not very large, some times even weak, apex facing anteriad or posteriad. Location of dorsal tooth varies from anterior end of buccal cavity to the base of it. Subventral teeth, denticle or longitudinal ridges may or may not be present. Oesophago-intestinal junction tuberculate.

Type subfamily :

Iotonchinae Jairajpuri, 1969

Other subfamilies :

Anatonchinae Jairajpuri, 1969

Miconchinae Andrássy, 1976

Remarks : Superfamily Anatonchoidea Jairajpuri, 1969 was considered only as a family of the superfamily Mononchoidea by Andrássy (1993) with three subfamilies as above.

SUBFAMILY IOTONCHINAE JAIRAJPURI, 1969

Diagnosis : (After Andrássy, 1993). Large-sized nematodes. Buccal cavity large, roomy. Excepting the genus ***Nullonchus*** Siddiqi, 1984, dorsal tooth present in all the other genera. Location of dorsal tooth varies, either anterior or posterior half of the buccal cavity. Subventral walls with or without denticles or longitudinal ridges. Female reproductive system monodelphic or amphidelphic. Oesophago-intestinal junction tuberculate.

Type genus :

Iotonchus Cobb, 1916

Other genera :

Caputonchus Siddiqi, 1984

Hadronchoides Jairajpuri and Rahman, 1984

Hadronchulus Ray and Das, 1983

Hadronchus Mulvey and Jensen, 1967

Iotonchulus Andrássy, 1993

Jensenonchulus Jairajpuri and Khan, 1982

Mulveyellus Siddiqi, 1984

Nullonchus Siddiqi, 1984

Parahadronchus Mulvey, 1978

Prionchulellus Mulvey and Jensen, 1967

Prionchuloides Meyl, 1963.

GENUS *IOTONCHUS* COBB, 1916

The genus ***Iotonchus*** was established by Cobb (1916). Initially it was placed under ***Mononchus*** by Cobb in 1893. In 1916 he separated it from ***Mononchus*** and proposed ***Iotonchus gymnolaimus*** as its type species. This genus is represented by more species as compared to other mononchs. Several workers have added many species to this genus. Jairajpuri and Khan (1982) recognised about 50 species. Andrássy (1993) after several synonymisation, combinations and new reports recognised only 47 species.

Some of the species were transferred and synonymised with other genera . He (l.c.) apparently recognised ***I. acuticaudus*** Mulvey and Jensen, 1967 as ***I. acuticaudatus*** which was reported by Eroshenko (1975) and already been transferred under ***Coomansus*** by Winiszewska - Slipinska (1993). Few species of Eroshenko (1975) and others were also transferred to ***Coomansus*** by Winiszewska - slipinska (1993) and some species were transferred to ***Iotonchulus, Jensenonchulus*** and ***Mulveyellus***. Many soil samples collected from Malnad tracts yielded different species of ***Iotonchus*** Three known and 5 new species were collected which are described and illustrated.

Diagnosis : (Emended). Dorsal tooth small to medium-sized, usually at the base of stoma, rarely in the midportion or anterior part. Subventral teeth totally absent. Amphids distinct. Oesophago-intestinal junction tuberculate. Excretory system may or may not be present. Female reproductive system mono-prodelphic or amphidelphic. Males common. Spicules long, arcuate with distinct gubernaculum. Lateral accessory pieces may or may not be present. Supplements few to numerous. Tails variable in size and shape, elongate-conoid to long filiform or whip-like. Caudal glands and opening generally present. spinneret terminal or subterminal.

Type species :

Iotonchus gymnolaimus (Cobb, 1893), Cobb, 1916

Other species :

According to Andrássy (1993) there are 47 valid species under the genus ***Iotonchus***. The 5 new species are being described under ***Iotonchus*** as follows :

I. apapillatus n.sp.

I. globibucca n.sp.

I. sringerii n.sp.

I. southi n.sp.

I. minutus n.sp.

IOTONCHUS TRICHURUS COBB, 1917

Measurements :

Females (n = 8) : L = 1.5 - 1.9 (1.7 ± 0.2) mm; a = 29.8 - 47.7 (38.3 ± 6.4); b = 4.4 - 7.4 (5.2 ± 1.2); c = 3.5 - 4.5 (4.1 ± 0.4); c' = 15-19.4 (16.2 ± 1.9); V = 58 - 62.6 (61 ± 2): G1 = 11 - 14; oesophagus 204 - 398 (345 ± 80) um, buccal cavity length 32 - 34 um; buccal cavity width 15 - 17 um; dorsal tooth apex from base 23 - 33%; nerve ring 107-119 um; rectum 20 - 31 (26 ± 1 5) um; tail 367 - 504.5 (430 ± 61) um; ABD 24.5 - 29 um.

Male : Not found.

Habitat and locality : Soil around roots of paddy (*Oryza sativa*) from Balehonnur, Chikmagalur Distt.

Remarks : The present specimens conform well with the description of *I. trichurus* Cobb, 1917 except in having slightly longer tail, buccal cavity, posteriorly located nerve ring and in the absence of excretory system (tail 350 - 400 um; buccal cavity 26 - 28 x 16-18 um; nerve ring at 88-105um and excretory system observed in *I. trichurus*).

IOTONCHUS BASIDONTUS CLARK, 1961

Measurements :

Females (n = 2) : L = 1.7 - 1.8 mm; a = 28 - 28.9; b = 4 - 4.1; c = 7.1 - 7.8; c' = 5.1 - 6.5; V = 57 - 61; G1 = 8 - 11; G2 = 8.5; oesophagus 419-445 um; buccal cavity length 47 - 51.5 um; buccal cavity width 28 - 29 um; dorsal tooth apex from base 23 - 25%; nerve ring 137 - 140 um; rectum 31 - 38 um; tail 223 - 250 um; ABD 43 um.

Male : Not found.

Habitat and locality : Soil around roots of pepper plants (***Piper nigrum***) from Sampigekan Estate.

Remarks : The present specimens conform well with the orginal description of ***I. basidontus*** Clark, 1961 except in having smaller buccal cavity, shorter tail and in the absence of males (buccal cavity 57 x 32 um; tail 15% of total body length vs 13-14% and males present in the type material).

IOTONCHUS SILVALLUS AHMAD AND JAIRAJPURI, 1983

(Fig. 40)

Measurements :

Males (n = 2) : L = 1.9 - 2 mm; a = 38 - 39; b = 4.3 - 4.7; c = 5.7 - 6; c' = 7.4 - 8.6; T = 36.4 - 38.4; spicule 69 - 75 um; gubernaculum 18 - 19 um; lateral accessory pieces 16 um; supplements 11; oesophagus 419 - 432 um; buccal cavity length 42 - 43 um; buccal cavity width 25 um; dorsal tooth apex from base 23 - 28%; nerve ring 132 - 135 um; rectum 38 - 39 um; tail 328 - 345 um; ABD 40 - 44 um.

Description :

Male : Medium-sized, ventrally arcuate upon fixation. Lip set off by expansion, 35 - 36 um wide, 13 um high. Amphids distinct, 8 um wide, located at 12 - 13 um from anterior end. Buccal cavity 1.7 to 1.8 times longer than wide, 42 - 43 um long, 25 um wide. Dorsal tooth at the base of stoma, its apex at 11 - 12 um or 23 - 28% from base. Excretory system present. Oeosphagus muscular. Oesophago-intestinal junction non-tuberculate.

Testes paired, outstretched. Spicules ventrally arcuate, 69 - 75 um long medially. Gubernaculum well developed. Lateral accessory pieces about 16 um long. Supplements 11 in number. Tail 17 - 18% of total body length or 7 - 9 anal body width long, conoid then cylindroid, ends in a sharp tip. Caudal glands tandem. Spinneret subterminal ventrally.

Habitat and locality : Soil around roots of tea plants (***Camellia sinensis***) from Alageswar Estate, Jairapura.

Female : Not found.

Remarks : General body size, all the ratios and size and shape of the tail, buccal cavity, etc., shows that these specimens are the males of ***I. silvallus*** Ahmad and Jairajpuri, 1983 (L = 1.42 - 1.85 mm; tail = 294 - 371 um; c = 4.8 - 5.4; c' = 7 - 12; lip region 31 - 36 x 13 - 14 um vs 35 x 13 um; buccal cavity 41 - 42 x 24 - 25 um, dorsal tooth apex at 11 - 12 um from base, spinneret subterminal ventrally and tail tip sharp in the females of ***I. silvallus***). These are reported for the first time from India.

IOTONCHUS APAPILLATUS N.SP.

(Fig 37)

Measurements :

Holotype female : L = 3 3 mm, a = 37 4, b = 5 0 c = 10 3, c' = 5 8, V = 62, G1 = 11, G2 = 12, oesophagus 673 um, buccal cavity length 72 um, buccal cavity width 44 um, dorsal tooth apex from base 19%, nerve ring 176 um, rectum 51 um, tail 321 um, ABD 55 um

Paratype females (n = 7) : L = 2 7 - 3 5 (3 1 ± 0 3) mm, a = 35 3 - 38 5 (37 1 ± 1 2), b = 4 4-4 7 (4 6±0 2), c = 10 3-12 6 (11 3 ± 1), c' = 4 3 - 5 8 (5 1 ± 0 7), V = 62 - 74 (65 ± 4 5), G1 = 10 6 - 11 5 (11 4 ± 0 6), G2 = 11 - 12 5 (12 ± 0 4), oesophagus 604 - 733 (679 ± 44) um, buccal cavity length 67 - 80 um, buccal cavity width 40 - 44 um, dorsal tooth apex from base 19 - 27% nerve ring 168 - 206 um, rectum 43 - 58 (52 ± 6) um, tail 240 - 306 (279 ± 32) um, ABD 52 - 57 (55 ± 2) um

Paratype males (n = 3) : L = 2 9 mm, a = 40 6 - 41 3, b = 4 6 - 4 7, c = 11 - 14 6, c' = 2 9 - 4 3, T = 40 - 43, spicule 125 - 138 um, gubernaculum 31 - 38 um, lateral accessory pieces 23 - 27 5 um, supplements 17-19, oesophagus 612 - 627 um, buccal cavity length 64 - 67 um, buccal cavity width 34-35 um, dorsal tooth apex from base 20-24%, nerve ring 161-176 um, rectum 76 - 80 um, tail 199 - 260 um, ABD 61 - 80 um

Description :

Female : Large-sized nematodes, 2 7 - 3 5 mm Strongly ventrally curved upon fixation Cuticle 1 5 - 3 um thick at various regions of the body Lip setoff by slight expansion, 55 - 61 um wide, 17 - 20 um high Amphids

distinct, located at 15 - 17 um from anterior end or at the base of lip region, 6 - 7 um wide Buccal cavity almost rectangular, 1 6 - 2 1 times longer than wide Dorsal tooth small, at the base of the stoma, its apex at 19 - 27% from the base Foramina present at the base Oesophagus muscular Oesophago-intestinal junction tuberculate Excretory system observed

Reproductive system amphidelphic Vulva post-equatorial, strongly muscular, sclerotized distally Vaginal muscles more stronger towards anteriad Advulval papillae absent Because of the anteriorly pulling muscles, vagina looks inclined anteriad Both the gonads equally developed Very strong sphincter present at oviduct-uterus junction Base of oviduct broad Oocytes arranged in a single line except at tip Tail conoid, then cylindorid with a slightly bulged tip, 4 - 6 anal body widths long Caudal glands tandem Spinneret and caudal pore terminal

Male : Similar to females in general morphology Slightly smaller than females Testes paired, outstretched Spicules long, ventrally arcuate, 125 - 138 um medially Lateral accessory pieces bidentate Gubernaculum well developed Supplements 17 - 19 in number, anterior 3 - 4 are weakly developed Caudal papillae distinct Tail similar to females

Type habitat and locality: Soil around roots of forest trees (unidentified) near N R Pura, Karnataka

Type material : Collected in January, 1995 Hototype female on slide ***Iotonchus apapillatus*** n sp and paratype females and males on slides ***Iotonchus apapillatus*** n sp /2 - 4

Relationship : ***Iotonchus apapillatus*** n.sp. closely resembles ***I. risoceiae*** Carvalho, 1955 in general morphology but distinctly differs from it in the shape of buccal cavity, smaller lip region, location of vulva, absence of advulval papillae and in having more ventromedian supplements in males (buccal cavity barrel - shaped, 78 - 80 X 56 - 57 um; lip region 68 X 17 um, V = 59 - 62; advulval papillae present and ventromedian supplements 15 - 17 in ***I. risoceiae***).

IOTONCHUS GLOBIBUCCA N.SP.

(Fig. 38)

Measurements :

Holotype female : L = 2.4 mm; a = 31.8; b = 5.0; c= 7.1; c = 8.2, V = 59; G1 = 16; G2 = 12; oesophagus 489 um; buccal cavity length 54 um; buccal cavity width 37 um; dorsal tooth apex from base 28%, nerve ring 145 mm; rectum 41 mm; tail 340 mm; ABC 41 mm.

Description : Body medium-sized , about 2.9 mm. Strongly, ventrally curved upon fixation. Cuticle 3 - 6 um thick at various parts of the body. Lip region slightly set off, truncated, 43 um wide, 14 um high. Amphids distinct, stirrup-shaped, 6 um wide, located just below lip base. Buccal cavity goblet-shaped, 1.5 times longer than wide, 54 um long, 37 um wide. Dorsal tooth at base of stoma, its apex at 28% from base. Foramina present. Excretory system not observed. Oesophagus muscular. Oesophago-intestinal junction tuberculate.

Reproductive system amphidelphic. Vulva post-equatorial, pore-like, sclerotization weak. Vagina cylindroid, less than one-half body width deep.

Advulval papillae one on each side. Both the gonads normally developed. Strong sphincter present at oviduct-uterus junction. Oviduct broad at the proximal end. Oocytes arranged in a single row except at tip. Tail conoid , then cylindroid, long, about 8 anal body widths long or 14% of total body length. Caudal glands and spinneret obscure or absent. Caudal opening not observed.

Male : Not found.

Type habitat and locality : Soil around roots of jack tree from Kadamane Estate, Hassan Distt.

Type material : Collected in March 1995. Holotype female on slide ***Iotonchus globibucca*** n.sp./1

Relationship : ***Iotonchus globibucca*** n.sp. is unique in having pore-like vulva and goblet-shaped buccal cavity. It comes closer to ***I. indicus*** Jairajpuri, 1969 but differs in having longer body, in the shape and size of buccal cavity, presence of strong sphincter, obscure caudal glands and spinneret (L = 1.75 mm; buccal cavity 40-47 x 28 - 32 um; sphincter not observed; caudal glands and spinneret weakly developed and vulva transverse in ***I. indicus***).

IOTONCHUS SRINGERII N.SP.

(Fig. 38)

Measurements :

Holotype female : L = 2.1 mm; a = 37.6; b = 4.4 c = 5.7; c' = 9.6; V = 65 3, G1 = 19.2; osophagus 470 um; buccal cavity length 44 um; buccal cavity

width 25 um, rectum 29 um, tail 365 um, ABD 38 um

Paratype females (n = 5) : L = 1 9 - 2 mm, a = 32 7 - 34 5 (33 7 ± 0 9), b = 4 2 - 4 6 (4 4 ± 0 2), c = 5 7 - 6 3 (5 9 ± 0 4), c' = 9 1 - 10 5 (9 9 ± 0 7), V = 63 - 68 (65 ± 2 5), G1 = 11 5 - 18 5 (15 ± 3 5), oesophagus 410 - 474 (440 ± 32) um, buccal cavity length 44 - 48 um, buccal cavity width 23 - 24 5 um, rectum 27 5 - 32 um, tail 300 - 352 (331 ± 25) um, ABD 34 - 35 um

Description :

Female : Body medium-sized, ventrally arcuate upon fixation Cuticle 1 5 - 5 um thick at various regions of the body Lip set off by narrowing, 31 - 35 um wide, 11 um high Amphids distinct, stirrup-shaped, 4 - 6 um wide, located at 11 - 12 um from anterior end or just below lip base Buccal cavity rectangular, twice as long as wide, 49 - 48 um long, 23 - 25 um wide Dorsal tooth at the base of stoma, its apex at 23 - 28% from base Foramina present Excretory system observed Nerve ring at 127 - 147 um from anterior end Oesophago-intestinal junction tuberculate

Reproductive system mono-prodelphic Posterior branch much reduced, about 10 - 11 um without any differentiation Vulva equatorial, sclerotized Advulval papillae one on each side Vagina less than one-half body width deep Uterus a slender, tubular structure without sperms Sphincter present at oviduct-uterus junction Oviduct broad at base Oocytes arranged in a single line except at tip Tail conoid, then cylindroid, about 9 - 10 5 anal body widths long or 16-18% of total body length Tail tip bluntly conoid Caudal glands tandem Caudal opening and spinneret sub-terminal slightly ventrally

Male : Not found.

Type habitat and locality : Soil around roots of forest trees (unidentified) from Sringeri, Karnataka.

Type material : Collected in April, 1993. Holotype female on slide ***Iotonchus sringerii*** n.sp./1 and paratype females on slides ***Iotonchus sringerii*** n.sp./2-4.

Relationship : ***Iotonchus sringerii*** n.sp. closely resembles ***I. acuticaudus*** Mulvey and Jensen, 1967 and ***I. silvallus*** Ahmad and Jairajpuri, 1983. From ***I. acuticaudus*** it differs in the size and shape of tail, position of vulva, lip width, size of buccal cavity and position of amphids (tail 170 - 220 um and terminus with dorsally subterminal spinneret; c = 9.1 = 11.8; V = 71 - 75; lip region 43 x 13 um; amphids located at 18 um from anterior end, buccal cavity 40 - 50 x 28 - 32 um or 1.4 - 1.6 times longer than wide in ***I. acuticaudus***). Further, it can be differentiated from ***I. silvallus*** in having greater c and lesser c' values, presence of excretory system, advulval papillae and in the shape of tail terminus (c = 4.8 - 5.4; c' = 7 - 12; excretory system absent; advulval papillae absent and tail terminus sharp in ***I. sivallus***).

IOTONCHUS SOUTHI N.SP.

(Fig. 39)

Measurements :

Holotype female : L = 2 mm; a = 32.7; b = 4.2; c = 5.7; c' = 10.5; V = 63.5; G1 = 16; oesophagus 474 um; buccal cavity length 47.5 um; buccal cavity width 24.5 um; tail 352 um; ABD 34 um.

Paratype females (n = 7) : L = 1.8 - 2.6 (2.3 ± 0.3) mm; a = 31.4 - 28.3 (35.4 ± 3); b = 3.7 - 4.5 (4.2 ± 0.3); c = 5.6 - 7.3 (6.3 ± 0.6); c' = 8 - 10.6 (9.7± 1.3). V = 66 - 80 (68 ± 6); Gl=16-21 (18±1 2); oesophagus 509 - 566 (542 ± 28) um; buccal cavity length 46 - 53.5 um; buccal cavity width 24.5 - 31 um; tail 336 - 405 (361 ± 31) um; ABD 39 - 45 um.

Male (n = 1) : L = 2.2 mm; a = 35.2; b = 4.3; c= 9.4; c' = 5; T == 38; spicule 76 um; gubernaculum 18 um lateral accessory pieces 16 um; supplements 12; oesophagus 508 um; buccal cavity length 50.5 um; buccal cavity width 24 um; dorsal tooth apex from base 24%; nerve ring 150 um; rectum 46 um; tail 229 um; ABD 49 um.

Description :

Female : Moderate-sized nematodes, body ventrally arcuate upon fixation. Cuticle 2 - 4 um thick at various regions of the body. Lip set off by slight expansion 35 - 41 um wide, 11 - 12 um high. Amphids small, 3 - 5 um wide, 9 - 14 um from anterior end. Buccal cavity rectangular, nearly twice as long as wide, 46 - 54 um long, 24.5 - 31 um wide. Dorsal tooth at the base, its apex located at 26 - 31% from base of stoma. Foramina present. Oesophagus muscular.Oeosphago-intestinal junction tuberculate. Nerve ring at 140-168 um from anterior end. Excretory system present.

Reproductive system mono-prodelphic. Posterior branch a rudimentary structure without any differention. Vulva post-equatorial, distally sclerotized. Advulval papillae one on each side. Vagina cylindroid, less than one-half body width deep. Uterus short. Strong sphincter present at oviduct-uterus junction. Base of oviduct broad. Oocytes arranged in single

line except at tip. Tail conoid, then long, cylindroid upto tip. Tail tip slightly bulged, bluntly conoid, caudal glands tandem. Caudal opening and spinneret subterminal ventrally.

Male : Similar to females except in having slightly shorter tail. Testes paired, outstretched, spicules 76 um long medially, arcuate. Gubernaculum 18 um long. Lateral accessory pieces about 16 um; bidentate. Supplements 12 in number. Tail similar to females, about 11% of total body length long.

Type habitat and locality : Soil around roots of grasses (unidentified) from Chikmagalur Zone.

Type material : Collected in June, 1993. Holotype female on slide ***Iotonchus southi*** n.sp./1 and paratype females and male on slides ***Iotonchus southi*** n.sp./2-4.

Relationship : ***Iotonchus southi*** n.sp. closely resembles ***I. acuticaudus*** Mulvey and Jensen, 1967; ***I. silvallus*** Ahmad and Jairajpuri, 1983 and ***I. pseudodigonicus*** Ahmad and Jairajpuri, 1983. From ***I. acuticaudus*** it differs in having differently shaped tail, tail length, spinneret position, shorter lateral accessory pieces, gubernaculum, lesser number of supplements and larger buccal cavity (tail tip acutely sharp; spinneret subterminal dorsally; tail 170 - 200 um; lateral accessory pieces 22 um; gubernaculum 25 um; supplements 6 - 8 and buccal cavity 40 - 50 x 27 - 32 um or 1.4 - 1.6 times longer than wide in ***I. acuticaudus***). Further, it can be differented from ***I. silvallus*** in having more posteriorly located vulva, larger buccal cavity, lip region and in the shape of tail terminus (V = 62-65; buccal cavity length 41 - 42 um; buccal cavity width 24 - 25 um; lip region 31-36 x 13 - 14 um and tail

terminus sharp in *I. silvallus)* It can also be differentiated from *I. pseudodigonicus* in the absence of post-uterine sac, greater c, c' values, posteriorly located vulva, larger spicules, gubernaculum and lateral accessory pieces, more ventromedian supplements, larger lips and buccal cavity (post uterine sac present, c = 4 1 - 5 1, c' = 8 - 12, V = 60 - 63, spicule 60 - 64 um, gubernaculum 15 - 17 um, lateral accessory pieces 11 - 13 um, supplements 6 - 8, lip region 34 - 42 x 13 - 14 um, buccal cavity 32 - 39 x 22 - 27 um in *I. pseudodigonicus*)

IOTONCHUS MINUTUS N.SP.

(Fig 40)

Measurements :

Holotype male : L = 1 4 mm, a = 53 5, b = 5 6, c = 4 6, c' = 12 - 4, T = 33, spicule 39 um, lateral accessory pieces 6 um, supplements 7, oesophagus 248 um, buccal cavity length 24 um, buccal cavity width 12 um, dorsal tooth apex from base 26%, nerve ring 89 um, rectum 20 um, tail 305 um, ABD 24 5 um

Paratype male (n = 1) : L = 1 5 mm, a = 50 8, b = 5 7, c = 4 6, c' = 12 4, T = 36 3, spicule 34 um, lateral accessory pieces 8 um, supplements 7, oesophagus 260 um, buccal cavity length 24 um, buccal cavity width 10 um, dorsal tooth apex from base 29%, nerve ring 92 um, rectum 26 um, tail 321 um, ABD 26 um

Description :

Male : Small and slender nematodes Body ventrally arcuate upon fixation Cuticle 0 5 - 1 um thick at various parts of the body Amphids small, located

at the base of lip region. Lip set off by expansion, 20 um wide, 8 - 9 um high. Buccal cavity small, about twice longer than wide, 24 um long, 10 - 12 um wide. Dorsal tooth at the base, its apex at 26-29% from the base of the stoma. Nerve ring at 89-92 um from amterior end. Excretory system not observed. Oesophagus compared to other species slender. Oesophago-intestinal junction tuberculate.

Testes paired, outstretched. Spicules moderately bulky, 34-39 um long. Gubernaculum small, complex. Lateral accessory pieces bidentate, about 6 - 8 um. Supplements 7 in number. Tail conoid, then long filiform with a bluntly pointed tip. Caudal glands feeble. Spinneret and caudal opening obscure.

Female : Not found.

Type habitat and locality : Soil around roots of tree coffee (***Coffea excelsa***) from Alageswar Estate, Jayapurra.

Type material : Collected in August, 1994. Holotype male on slide ***Iotonchus minutus*** n.sp./1 and paratype male on slide ***Iotonchus minutus*** n.sp./2.

Relationship : ***Iotonchus minutus*** n.sp. males are not resembling any of the already described species of ***Iotonchus***. Owing to the body size, particularly the buccal cavity, it resembles ***I. chantaburensis*** Buangsuwon and Jensen, 1966. But it distinctly differs from the above in having longer body, greater a, b, c values, lip size, position of dorsal tooth, nerve ring, in the tail shape and absence of terminal spinneret (L = 0.89 - 1.0 mm; a = 24 - 32; b = 3.5 - 4.4; c = 3.8 - 4.9; lip region 28 x 8 um; dorsal tooth apex at 5 um or 22 7% from base, nerve ring at 69 um from anterior end, tail conoid, then cylindroid; spinneret distinctly terminal in ***I. chantaburensis***).

GENUS *PARAHADRONCHUS* MULVEY, 1978

Mulvey (1978) established the genus ***Parahadronchus*** to accommodate those species of ***Hadronchus*** Mulvey and Jensen, 1967 which were characterized by a barrel - shaped buccal cavity, dorsal tooth at the base of stoma opposed by two or four short longitudinal ridges bearing small denticles, monodelphic or amphidelphic gonads He (l c) shifted ***Hadronchus andamanicus*** Jairajpuri, 1969 to ***Parahadronchus*** and made it the type species of the genus ***H. shakili*** Jairajpuri, 1969 and ***H. yuenae*** Thong, 1971 were also transferred to ***Parahadronchus*** by Mulvey (1978) Dhanachand ***et al.*** (1991), Renubala and Dhanachand (1992) and Andrassy (1993) added 3 more species under this genus Andrássy (1993) placed ***Hadronchus diphuensis*** Phukan and Sanwal, 1981 under ***Parahadronchus*** and synonymised ***H. karangensis*** Phukan and Sanwal, 1981 with ***P. shakili*** In the present study also a new species of ***Parahadronchus*** was collected from the Malnad tracts and the same is described with illustrations

Diagnosis : (After Jairajpuri and Khan, 1982) Medium to large-sized nematodes Buccal cavity barrel-shaped, thick-walled and flattened at base Dorsal tooth large, situated in the posterior half of the stoma, its apex directed forward. Subventral walls with few to many denticles arranged longitudinally at the posterior half. Oesophago-intestinal junction tuberculate Female reproductive system amphidelphic or mono-prodelphic Spicules large with prominent lateral accessory pieces and a simple gubernaculum Tails, conoid, then long cylindroid with slightly bulged tip Caudal glands and spinneret well developed

Type species :

Parahadronchus andamanicus (Jairajpuri, 1969) Mulvey, 1978

Other species :

P. shakili (Jairajpuri, 1969) Mulvey, 1978

P. yuenae (Thong, 1971) Mulvey, 1978

P. subhonicus Dhanachand, Renubala and Mohilal, 1991

P. marami Renubala and Dhanchand, 1992

P. siroii Renubala and Dhanachand, 1992

P. diphuensis (Phukan and Sanwal, 1981) Andrássy, 1993

P. egregius Andrássy, 1993

P. magnus n.sp.

PARAHADRONCHUS MAGNUS N.SP.

(Fig. 41)

Measurements :

Holotype female : L = 4.7 mm; a = 51.4; b = 4.9; c = 7.8; c' = 9.9; V = 58; G1 = 10.9; G2 = 10.7; oesophagus 963 um; buccal cavity length 84 um; buccal cavity width 47 um; dorsal tooth apex from base 38%; nerve ring 237 um; rectum 60 um; tail 604 um; ABD 61 um.

Paratype females (n = 5) : L = 3.6 - 4.7 (4.2 ± 0.6) mm; a = 48.4 - 51.4 (49.6 ± 1.6); b = 4.4 - 4.9 (4.7 ± 0.3); c = 7.8 -9.1 (8.6 ± 0.7); c'=7.9 - 9.9 (8.9 ± 1.0); V = 58 - 60; G1 = 10 - 12; G2 = 10 - 11; oesophagus 826 - 963 (907 ± 72) um; buccal cavity length 70-84 um; buccal cavity width 44-47 um; dorsal tooth apex from base 38 - 41%; nerve ring 214 - 237 um; rectum 43 - 60 um; tail 398 - 609 (497 ± 103) um; ABD 50.5 - 61 (55.6 ± 5.4) um.

Paratype males (n = 3) : L = 4 - 4.1 mm; a = 50.2 - 5.7 (50.5 ± 0.4); b = 4.1 - 4.4; c = 10.1 - 10.7; c' = 4.6; T = 37.6 - 40.6; spicule 122 - 145 (131 ± 16) um; gubernaculum 31 um; lateral accessory pieces 31 - 34 um; supplements 15 - 16; oesophagus 934 - 994 (963 ± 43) um; buccal cavity length 69 - 73 um; buccal cavity width 40 - 41 um; dorsal tooth apex from base 29 - 35%; nerve ring 210 - 214 um; rectum 84 um; tail 370 - 398 (390 ± 11) um; ABD 83 - 86 um.

Description :

Female : Body large-sized, more than 4.5 mm long. slightly to strongly ventrally arcuate upon fixation, tapering posteriorly. Cuticle smooth, 2 - 4 um thick at various regions of body. Lip set off by expansion 54 - 61 um wide, 15 - 17 um high. Amphids small, cup - like, 7 - 8 um wide, located at 17 - 20 um from anterior end. Stoma consists a hexaradiate vestibulum and a barrel - shaped buccal cavity, 69 - 84 um long and 40 - 47 um wide. Walls of buccal cavity formed by two sets of strongly sclerotized plates, a vertical set of three, of which the dorsal one bears at its base a large tooth, its apex at 29 - 33 um or 38 - 41% from the base. Subventral walls bear 5 - 6 denticles at the base in longitudinal row. Foramina present. Oesophagus very muscular. Oesophago-intestinal junction tuberculate. Oesophageal lumen strongly cuticularized. Nerve ring at or about four times labial widths from anterior end. Excretory system not clear except in one specimen.

Reproductive system amphidelphic. Vulva transverse with cuticularized lips. Vulval papillae absent. Vagina long, thick walled, about one half of body width deep. Musculature on the vagina is strongly directed anteriad. Both the gonads equally developed. Uterus long, oviduct broad at base. Strong sphincter present at oviduct-uterus junction. Oocytes arranged in a single row except

at tip Tail conoid, then long cylindroid, 8 - 9 anal body widths long with a slightly bulged tip Caudal glands tandem Caudal opening and spinneret terminal

Male : Similar to females Body more curved especially in the posterior part Testes paried, outstretched Spicules massive, 122 - 145 um long medially, Gubernaculum well developed, about 31 um long Lateral accessory pieces bidentate, about 31 - 34 um long Supplements 15 - 16 in number Tail slightly shorter than females, about 5 anal body widths long Caudal papillale 3 - 4

Type habitat and locality : Soil around roots of banana tree (***Musa paradisiaca***) from Nethrakonda

Type material : Collected in June, 1993 Holotype female on slide ***Parahadronchus magnus*** n sp /1 and paratype females and males on slides ***Parahadronchus magnus*** n sp /2-4

Relationship : ***Parahadronchus magnus*** n sp differs from the other species of the genus in having a very large body and consequently different body ratio Based on the reproductive system, it can be compared with ***P. shakili*** (Jairajpuri, 1969) Mulvey, 1978, but it distinctly differs from it in the body length, greater a and lesser c values, anteriorly located vulva, very large buccal cavity, posteriorly located nerve ring, larger spicules, gubernaculum, lateral accessory pieces, more ventromedian supplements and in having longer tail (L = 2 66 - 3 03 mm, a = 35 - 42, c = 8 - 11, V = 63 - 70, buccal cavity 46-65 x 30 - 40 um, more ring 151 - 193 um, spicules 84 - 93 um, gubernaculum 18 - 23 um, lateral accessory pieces 12 - 18 um, supplements 11 - 13 and tail 260 - 380 um in ***P. shakili***)

SUPERFAMILY MONONCHULOIDEA DE CONINK, 1965

Initially, the genera which are now placed under the suborder Bathyodontina were placed under Nygolaimina Thorne, 1935. It was Clark (1961) who revised the Order Enoplida and placed the genera ***Bathyodontus*** Fielding, 1950, ***Oionchus*** Cobb, 1913 and ***Microlaimus*** Andrássy, 1956 under the superfamily Mononchoidea removing them from Dorylaimoidea Jairajpuri (1969) raised Bathyodontidae to superfamilial status. Coomans and Loof (1970) raised this superfamily to subordinal rank with two superfamilies, viz., Bathyodontoidea and Mononchuloidea. However, Andrássy (1976) did not agree with the proposal of suborder Bathyodontina and regarded it as a superfamily under Mononchina with Bathyodontidae and Mononchulidae as families. Jairajpuri and Khan (1982) accepted the proposal of Coomans and Loof (1970) and regarded Bathyodontina with Bathyodontoidea and Mononchuloidea as superfamilies. They (l.c.) considered only the following two genera, viz., ***Oionchus*** and ***Mononchulus*** as valid. In the present study Jairajpuri and Khan's (1982) views have been accepted.

Diagnosis : (After Jairajpuri and Khan , 1982). Comparatively small-sized nematodes. Buccal cavity long, cylindrical, thick walled with three teeth or a mural tooth opposed by transverse rows of denticles. Oesophago-intestinal glands with 3 cardiac glands. Female reproductive system mono-prodelphic. Tail short, hemispheroid or long, cylindrical, with distinct caudal glands and spinneret. Males not known for this superfamily.

Type and only family :

Mononchulidae De Conink, 1965

FAMILY MONONCHULIDAE DE CONINK, 1965

Diagnosis : (After Jairajpuri and Khan, 1982). This family is represented by nematodes having long buccal cavity with or without a mural tooth and transverse denticles. Oesophago-intestinal junction with three glands. Female reproductive system mono-prodelphic. Males not reported.

Type and only subfamily :

Mononchulinae De Conink, 1965

SUBFAMILY MONONCHULINAE DE CONINK, 1965

Diagnosis : (Emended). Small to medium-sized animals. Buccal cavity long, thick walled, cylindrical, tapering posteriorly. Subventral tooth larger and grooved or a mural tooth, transverse denticles present at the anterior end. Three cardiac glands present at the oesophago-intestinal junction. Female reproductive system mono-prodelphic. Tail short, hemispherical or long cylindrical. Caudal glands and spinneret present. Spinneret either subterminal dorsally or ventrally. Males were not known under this group.

Type genus :

Mononchulus Cobb, 1918

Other genus :

Oionchus Cobb, 1913

Genus inquirendum :

Rahimium (Rahm, 1938) Andrássy, 1973

GENUS *OIONCHUS* COBB, 1913

Cobb (1913) established the genus ***Oionchus*** for those specimens with long, cylindrical, thick-walled buccal cavity, large mural tooth at the junction of anterior and posterior parts of buccal cavity, transverse denticles, mono-prodelphic gonads and short, hemispherical tail with subterminal spinneret. Clark (1961) placed it under the family Bathyodontidae Andrássy (1973) proposed it under Mononchulidae which was accepted by later workers. Specimens of the genus ***Oionchus*** commonly occur in India. In the present study, a known species collected from the Malnad tracts is reported.

Diagnosis.: (After Jairajpuri and Khan, 1982). Nematodes with long, cylindrical and thick-walled buccal cavity, with a large mural tooth arising from the junction of anterior and posterior parts of buccal cavity. Subventral walls bear two transverse rows of denticles. Amphids stirrup-shaped Oesophago-intestinal junction with three cardiac glands, each consisting of four cells. Reproductive system mono-prodelphic. Males not reported for this group. Tail short, hemispherical. Caudal glands and opening present Spinneret subterminal dorsally or ventrally.

Type species :

Oionchus obtusus Cobb, 1913

Other species :

O. paraobtusus Jairajpuri and Khan, 1982

Species inquirende :

O. didelphus Sukul, 1971

O. setosus Sukul, 1972

OIONCHUS OBTUSUS COBB, 1913

Measurments :

Females (n = 4) : L = 1 - 1.2 mm; a = 29.4 -30.4 (29.9 ± 0.5); b = 3.7 - 4.1 (3.9 ± 0.1); c = 42.6 - 44.7 (43.7 ± 1); c' = 0.9 - 1; V = 58 - 62 (60 ± 2); G1 = 9.5 - 14.7 (12.8 ± 2.3); oesophagus 268 - 286 um; buccal cavity length 27 - 27.5 um; buccal cavity width 8 um; mural tooth apex from base of stoma 86 - 94.5%; rectum 20 - 23 um; tail 25 - 26 um; ABD 25 - 26 um; spinneret subterminal dorsally.

Male : Not found.

Habitat and locality : Collected from soil around roots of grasses (unidentified) and paddy (*Oryza sativa*) from Muthinakoppa.

Remarks : The present specimens conform well with the Indian population of *O. obtusus* Cobb, 1913 except in the absence of post-uterine sac and in having slightly longer tail (post-uterine sac 6 - 8 um and tail 18 - 22 um in the Indian population of *O.obtusus*).

SUMMARY

The thesis deals with taxonomic studies of the two major soil nematode groups, viz., the dorylaims and mononchs. The work has been split into two different parts since the dorylaims and mononchs are quite distinct and different from one another. The first part is on the dorylaim nematodes while the second and comparatively smaller part deals with the mononchs.

The Malnad tracts, which are the hilly parts of Karnataka state where most of the plantation crops, viz., coffee, cardamom, tea, pepper and also paddy, coconut, banana are grown, were chosen for the present study. Soil samples from various localities and plants were collected from Malnad tracts and were analysed. As a result of this, a number of species of the Orders Dorylaimida and Mononchida were obtained. In comparison with dorylaim nematodes, mononchs were fewer in numbers. But, as a whole, the Malnad tracts are very rich in nematode fauna of different groups, which may be due to the fact that the soil in these area is very rich in organic matter and a well distributed rainfall throughout the year.

In the present work, detailed studies on the morphological characters, systematic position and diagnostic features of the species of both groups were carried out. An attempt has also been made to study the morphological details of the muscular sheath surrounding the male reproductive organs in the genus ***Axonchium***. Diagnoses of the taxa up to generic rank have been provided.

In all, 95 species of nematodes belonging to the above two Orders, 4 suborders, 8 superfamilies, 16 families, 29 subfamilies, 36 known genera, 6 new genera, 8 known subgenera and 2 new subgenera were collected and studied. A total number of 56 new species have been described in detail with necessary illustrations. Thirty two known species were are aslo being reported with remarks, if any. Six species are reported for the first time from India and also the males of one of the species.

There are 44 new species belonging to the Order Dorylaimida and 12 new species to Mononchida. The 5 new genera, viz., ***Kunjudorylaimus, Neolordellonema, Paraoxybelondira, Duriella*** and ***Paraleptonchus***; two new subgenera, viz., ***Uniqaxonchium*** and ***Nygellolaimellus*** are reported in Dorylaimida while the new genus ***Malnadus*** belongs to Mononchida.

The list of Orders, suborders, superfamilies etc , are presented below

THE ORDERS

1 Dorylaimida
2 Mononchida

THE SUBORDERS

1 Dorylaimina
2 Nygolaimina
3 Mononchina
4 Bathyodontina

THE SUPERFAMILIES

1 Dorylaimoidea
2 Actinolaimoidea
3 Longidoroidea
4 Belondiroidea
5 Tylencholaimoidea
6 Nygolaimoidea
7 Mononchoidea
8 Mononchuloidea

THE FAMILIES

1 Laimydoridae
2 Aporcelaimidae
3 Qudsianematidae
4 Nordiidae
5 Actinolaimidae
6 Longidoridae
7 Xiphinematidae
8 Belondiridae
9 Tylencholaimidae
10 Leptonchidae
11 Nygolaimidae
12 Nygellidae
13 Mononchidae
14 Mylonchulidae
15 Anatonchidae
16 Mononchulidae

THE SUBFAMILIES

1 Laimydorinae
2 Thornenematinae
3 Aporcelaiminae

4. Sectonematinae
5. Discolaiminae
6. Lordellonematinae
7. Cephalodorylaiminae
8. Pungentinae
9. Actinolaiminae
10. Paractinolaiminae
11. Brittonematinae
12. Longidorinae
13. Xiphinematinae
14. Belondirinae
15. Dorylaimellinae
16. Swangeriinae
17. Tylencholaimellinae
18. Leptonchinae
19. Tyleptinae
20. Belonenchinae
21. Tylencholaimellinae
22. Nygolaiminae
23. Solididentinae
24. Nygellinae
25. Mononchinae
26. Cobbonchinae
27. Mylonchulinae
28. Iotonchinae
29. Mononchulinae

THE KNOWN GENERA

1. ***Laimydorus***
2. ***Coomansinema***
3. ***Aporcedorus***
4. ***Sectonema***
5. ***Mylodiscus***
6. ***Cephalodorylaimus***
7. ***Lenonchium***
8. ***Neoactinolaimus***
9. ***Egtitus***
10. ***Paractinolaimus***
11. ***Paractinolaimoides***
12. ***Stopractinca***

13. ***Longidorus***
14. ***Paralongidorus***
15. ***Xiphinema***
16. ***Belondira***
17. ***Paraoxydirus***
18. ***Discomyctus***
19. ***Chitwoodius***
20. ***Proleptonchus***
21. ***Proleptonchoides***
22. ***Tyleptus***
23. ***Oostenbrinkiella***
24. ***Clavicaudoides***
25. ***Aquatides***
26. ***Solididens***
27. ***Clavicauda***
28. ***Nygellus***
29. ***Mononchus***
30. ***Clarkus***
31. ***Sporonchulus***
32. ***Cobbonchus***
33. ***Mylonchulus***
34. ***Iotonchus***
35. ***Parahadronchus***
36. ***Oionchus***

THE KNOWN SUBGENERA

1. ***Axonchium***
2. ***Tylencholaimus***
3. ***Amphitylencholaimus***
4. ***Opisthotylencholaimus***
5. ***Protylencholaimus***
6. ***Basirotyleptus***
7. ***Coronatyleptus***
8. ***Coronatylencholaimellus***

THE NEW GENERA

1. ***Kunjudorylaimus***
2. ***Neolordellonema***
3. ***Paraoxybelondira***
4. ***Duriella***
5. ***Paraleptonchus***
6. ***Malnadus***

THE NEW SUBGENERA

1. ***Uniqaxonchium***
2. ***Nygellolaimellus***

THE KNOWN SPECIES

1. *Laimydorus dhanachandi*
2. *Aporcedorus punctatus*
3. *Sectonema procta*
4. *Cephalodorylaimus papillatus*
5. *Xiphinema americanum*
6. *Xiphinema insignae*
7. *Xiphinema elongatum*
8. *Belondira nepalensis*
9 *Belondira tenuidora*
10. *Axonchium amplicolle*
11. *Axonchium saccatum*
12. *Axonchium elegans*
13. *Axonchium shamimi*
14. *Paraoxydirus novus*
15. *Paraoxydirus gigas*
16. *Amphitylencholaimus teres*
17. *Proleptonchus aestivus*
18. *Proleptonchus clarus*
19. *Tyleptus striatus*
20. *Basirotyleptus basiri*
21. *Aquatides thornei*
22. *Solididens australis*
23. *Clavicauda symmetricus*
24. *Mononchus tunbridgensis*
25. *Clarkus sheri*
26. *Sporonchulus ibitensis*
27. *Mylonchulus hawaiiensis*
28. *Mylonchulus contractus*
29. *Mylonchulus mulveyi*
30. *Iotonchus trichurus*
31. *Iotonchus basidontus*
32. *Oionchus obtusus*

FIRST REPORT FROM INDIA

1. *Xiphinema simillum*
2. *Belondira ortha*
3. *Belondira tarjani*
4. *Axonchium keynsi*
5. *Paraoxydirus cavenessi*
6. *Tylencholaimus ibericus*

FIRST REPORT OF MALE

1. Iotonchus silvallus

THE NEW SPECIES

1. *Kunjudorylaimus kunjuensis*
2. *Kunjudorylaimus srini*

3. *Coomansinema alduri*
4. *Coomansinema digiticauda*
5. *Mylodiscus parananus*
6. *Neolordellonema nivethi*
7. *Lenonchium anamicus*
8. *Lenonchium singulatus*
9. *Neoactinolaimus protrudus*
10. *Egtitus kodagus*
11. *Egtitus nethrus*
12. *Paractinolaimus chiki*
13. *Paractinolaimoides longicaudatus*
14. *Stopractinca malnadensis*
15. *Longidorus indicus*
16. *Paralongidorus ciaressi*
17. *Xiphinema dimorphis*
18. *Belondira beluri*
19. *Belondira paratumicauda*
20. *Belondira ovatum*
21. *Axonchium cooverkolli*
22. *Axonchium hosakodii*
23. *Axonchium camelliae*
24. *Uniqaxonchium megaspiculum*
25. *Nygellolaimellus muthi*
26. *Paraoxydirus abnormus*
27. *Paraoxybelondira mayili*
28. *Duriella elongatus*
29. *Amphitylencholaimus cosmos*
30. *Opisthotylencholaimus karnataki*
31. *Protylencholaimus longisacca*
32. *Discomyctus bisexualis*
33. *Chitwoodius musae*
34. *Chitwoodius curvistylus*
35. *Paraleptonchus convolusus*
36. *Proleptonchoides equistylus*
37. *Tyleptus oryzae*
38. *Coronatyleptus indicus*
39. *Coronatylencholaimellus amphidius*
40. *Oostenbrinkilla ventrostylus*
41. *Clavicaudoides paratrophurus*
42. *Aquatides minutus*
43. *Clavicauda differentialis*
44. *Nygellus zingli*
45. *Mononchus oryzae*
46. *Mononchus piperae*
47. *Malnadus malnadi*
48. *Cobbonchus inclinatus*
49. *Cobbonchus papillatus*
50. *Cobbonchus citri*
51. *Iotonchus apapillatus*
52. *Iotonchus globibucca*
53. *Iotonchus sringerii*
54. *Iotonchus southi*
55. *Iotonchus minutus*
56. *Parahadronchus magnus*

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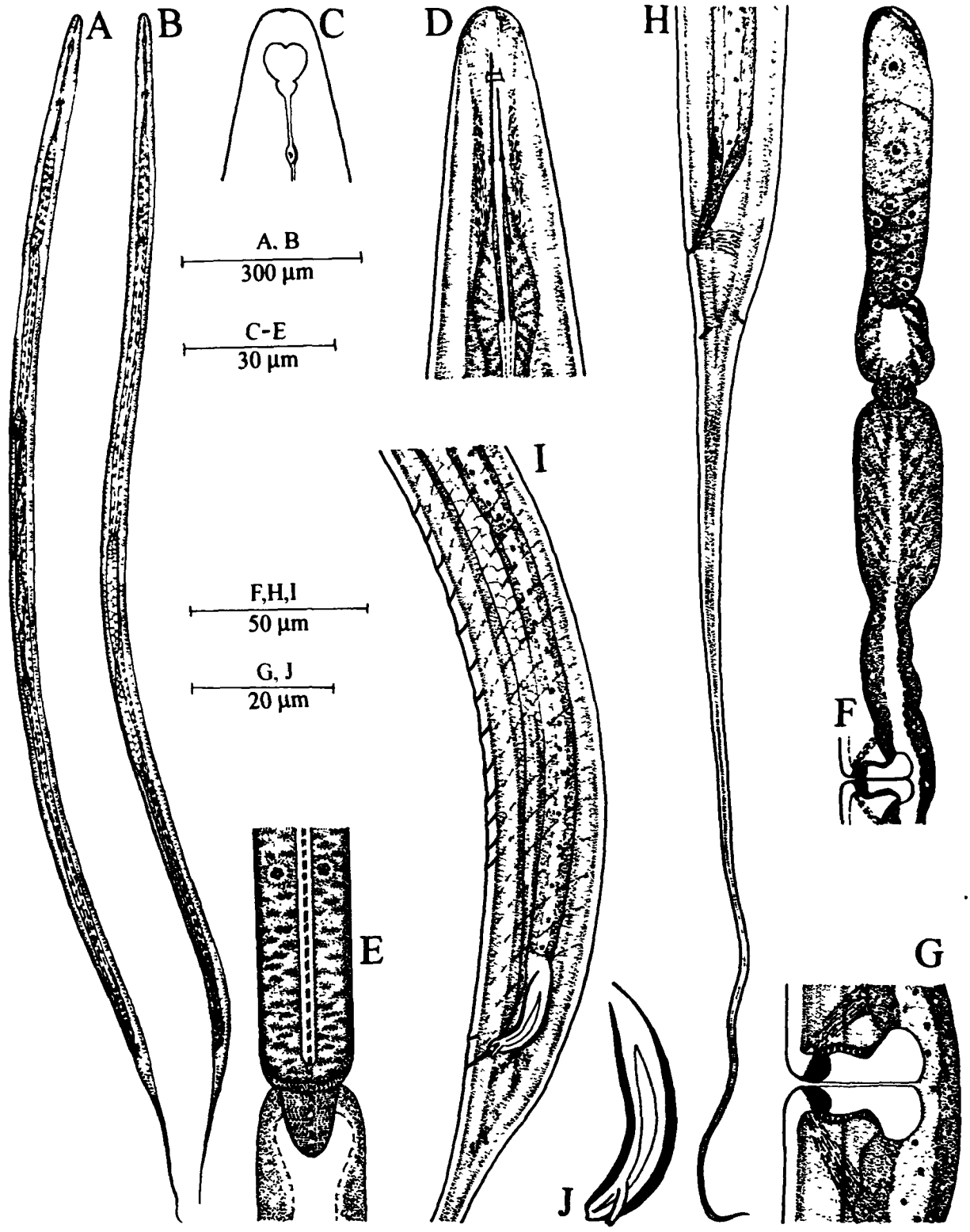

Fig. 1. ***Kunjudorylaimus kunjuensis*** n.gen., n.sp. A. Entire female; B.Entire male; C. Anterior region showing amphid; D. Anterior region; E.Oesophago-intestinal junction; F.Female gonad (anterior); G. Vulval region;H.Female posterior region; I. Male posterior region; J. Spicule.

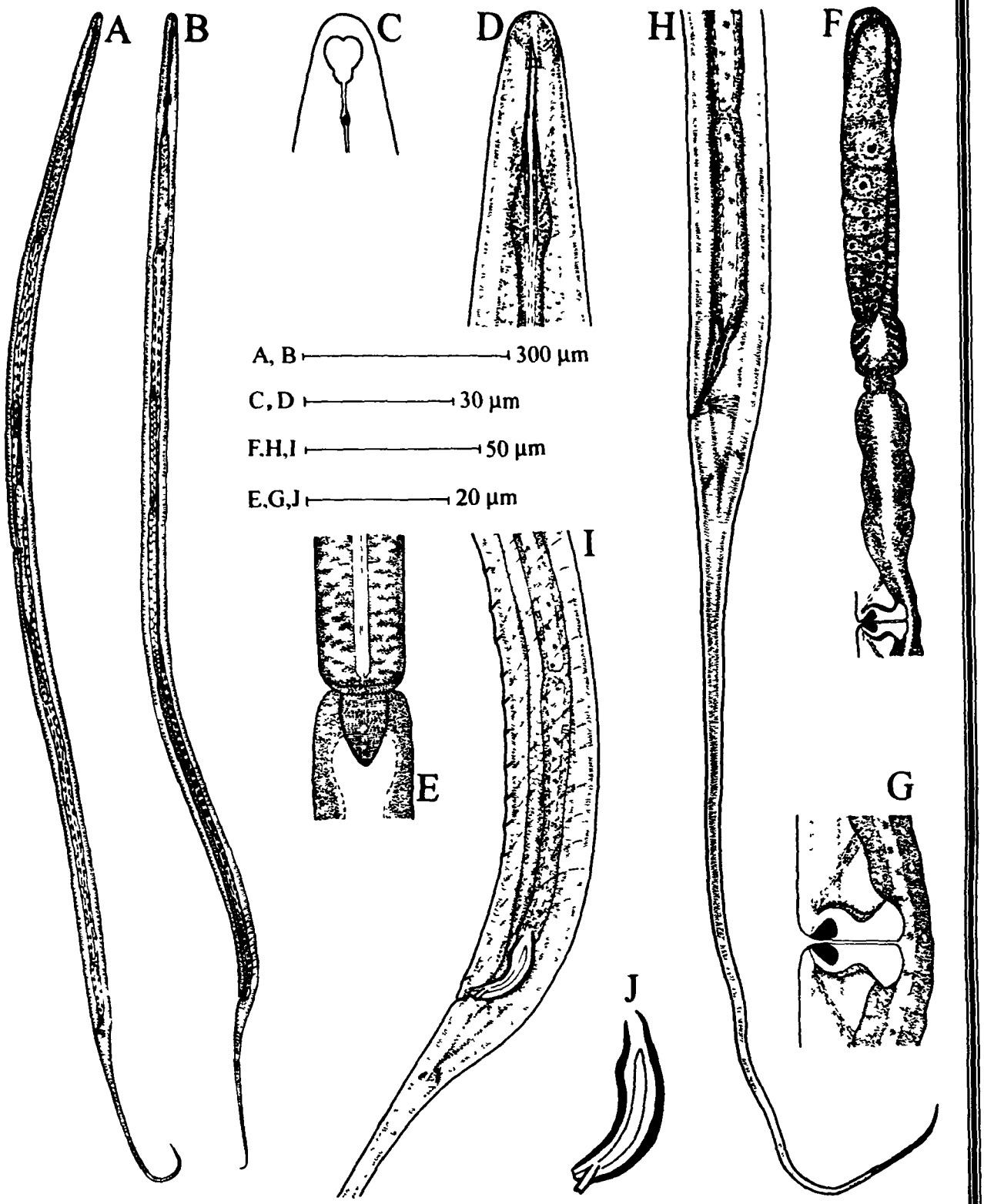

Fig. 2. ***Kunjudorylaimus srini*** n.sp. A. Entire female; B. Entire male, C Anterior region showing amphid; D. Anterior region; E. Oesophago-intestinal junction; F. Female gonad (anterior); G. Vulval region, H Female posterior region; I. Male posterior region; J. Spicule

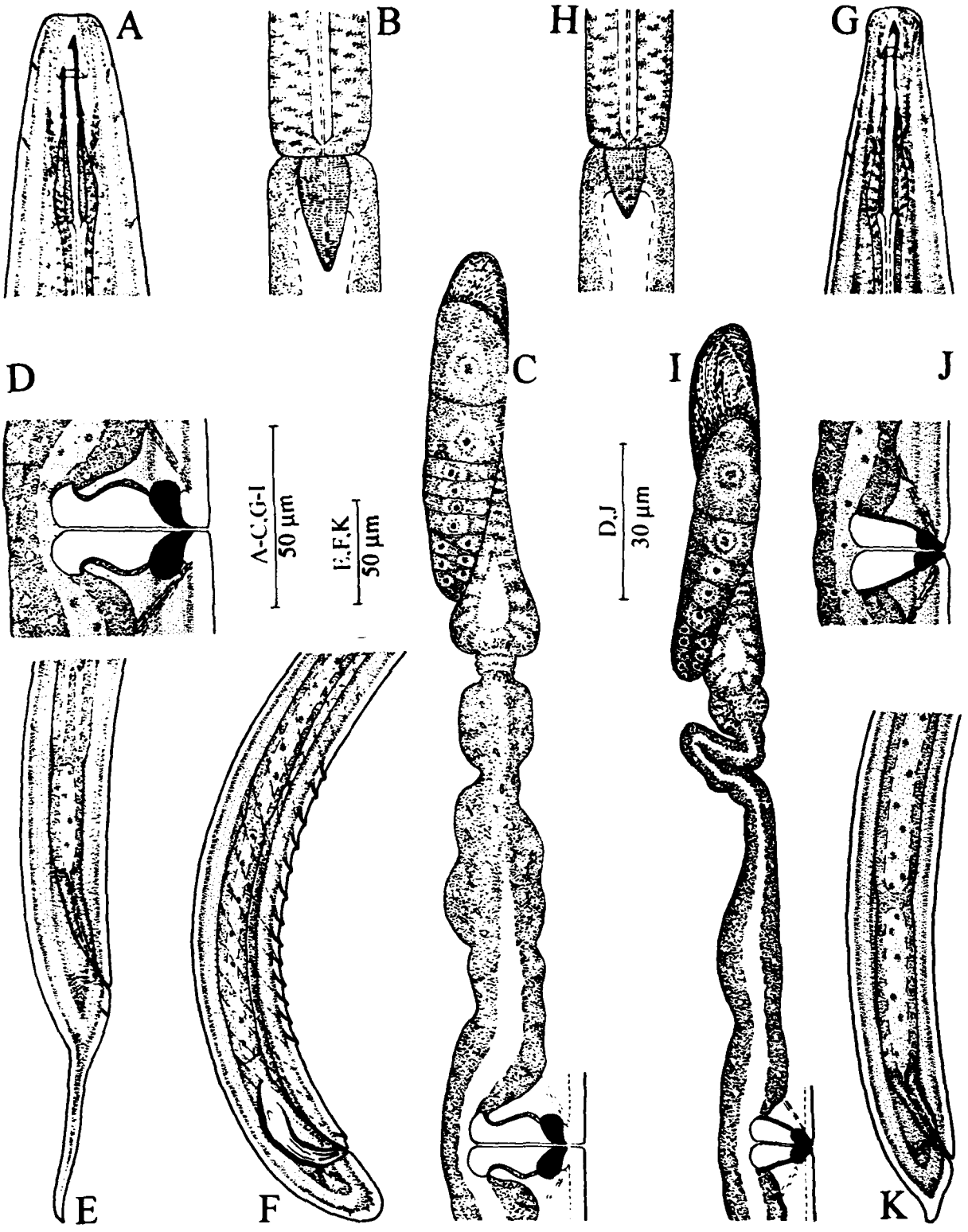

Fig. 3. ***Coomansinema alduri*** n.sp. A. Anterior region; B. Oesophago - intestinal junction; C. Female gonad (anterior); D. Vulval region; E. Female posterior region; F. Male posterior region.
Coomansinema digiticauda n.sp. G. Anterior region; H. Oesophago-intestinal junction;I. Female gonad (anterior); J. Vulval region; K. Female posterior region.

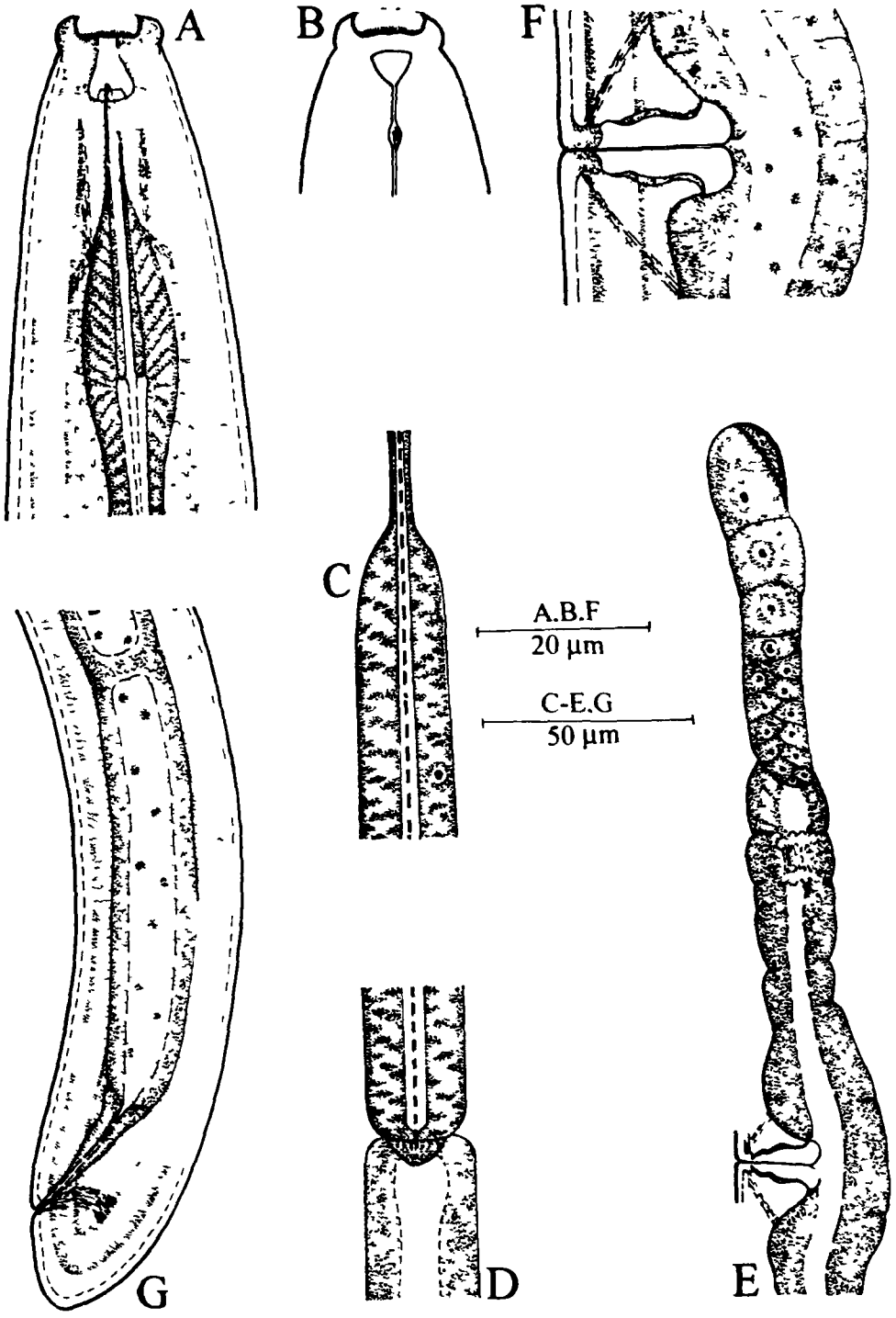

Fig. 4. *Mylodiscus parananus* n sp A Anterior region, B Anterior region showing amphid, C Oesophageal expansion, D Oesophago-intestinal junction, E Female gonad (anterior), F Vulval region, G Female posterior region

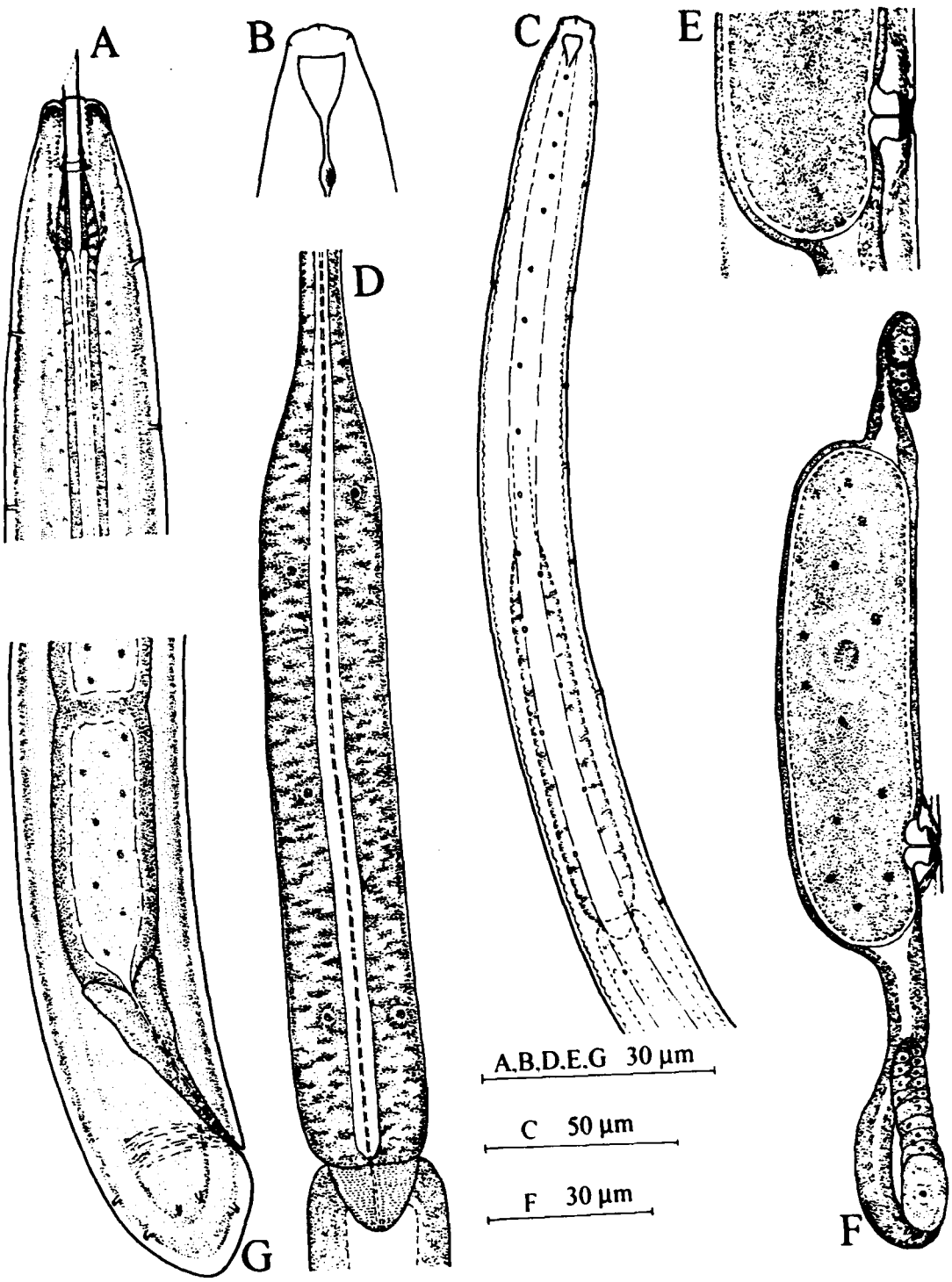

Fig. 5. ***Neolordellonema nivethi*** n.gen., n.sp. A. Anterior region; B. Anterior region showing amphid; C. Anterior region showing body pores; D. Basal expanded part of oesophagus and oesophago-intestinal junction; E. Vulval region; F. Female genital branches; G. Female posterior region.

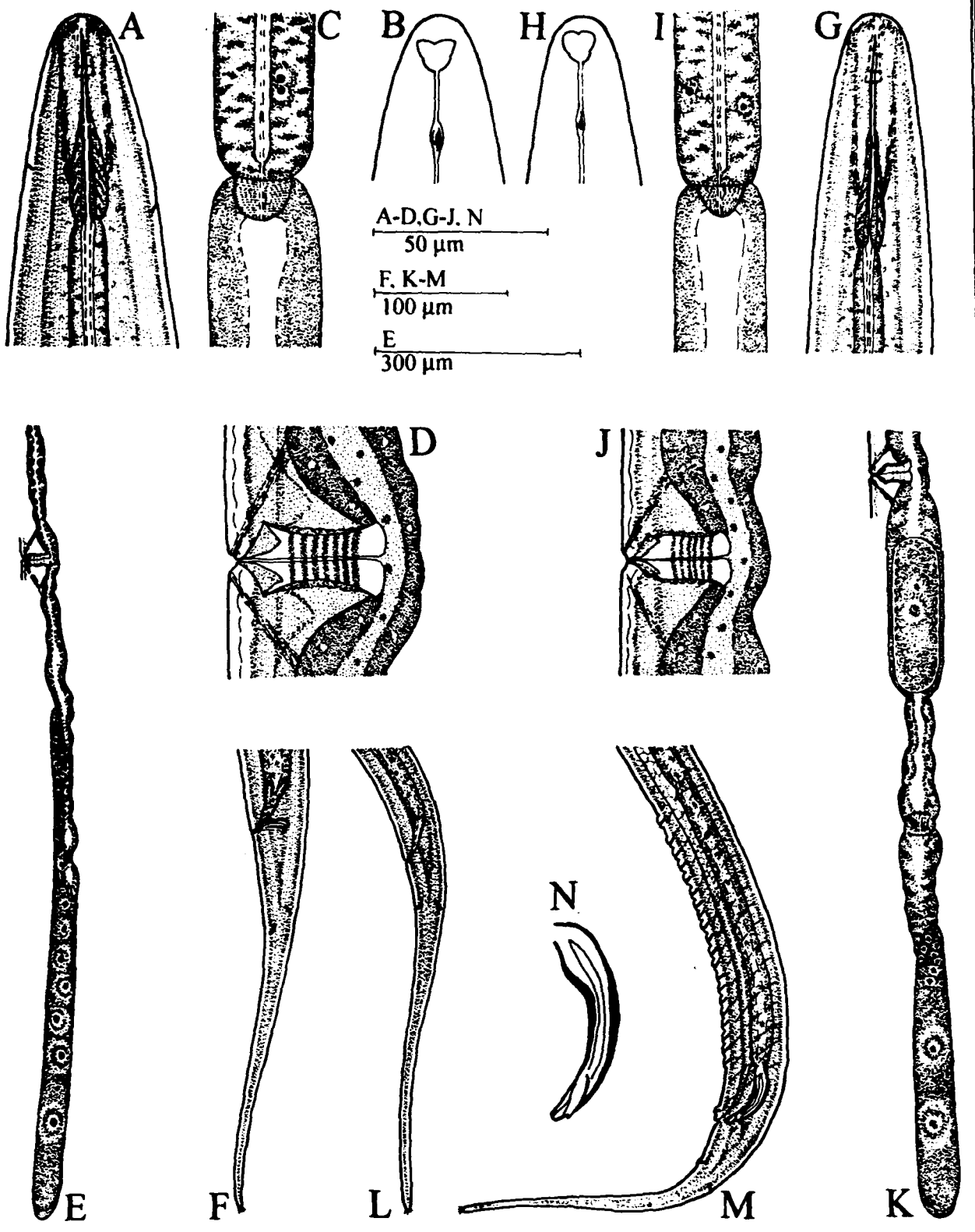

Fig. 6. ***Lenonchium singulatus*** n.sp. A. Anterior region; B. Anterior region showing amphid; C. Oesophago-intestinal junction; D. Vulval region; E. Female gonad (posterior); F. Female posterior region.
Lenonchium anamicus n.sp. G. Anterior region; H. Anterior region showing amphid; I. Oesophago-intestinal junction; J. Vulval region; K. Female gonad (posterior); L. Female posterior region; M. Male posterior region; N. Spicule.

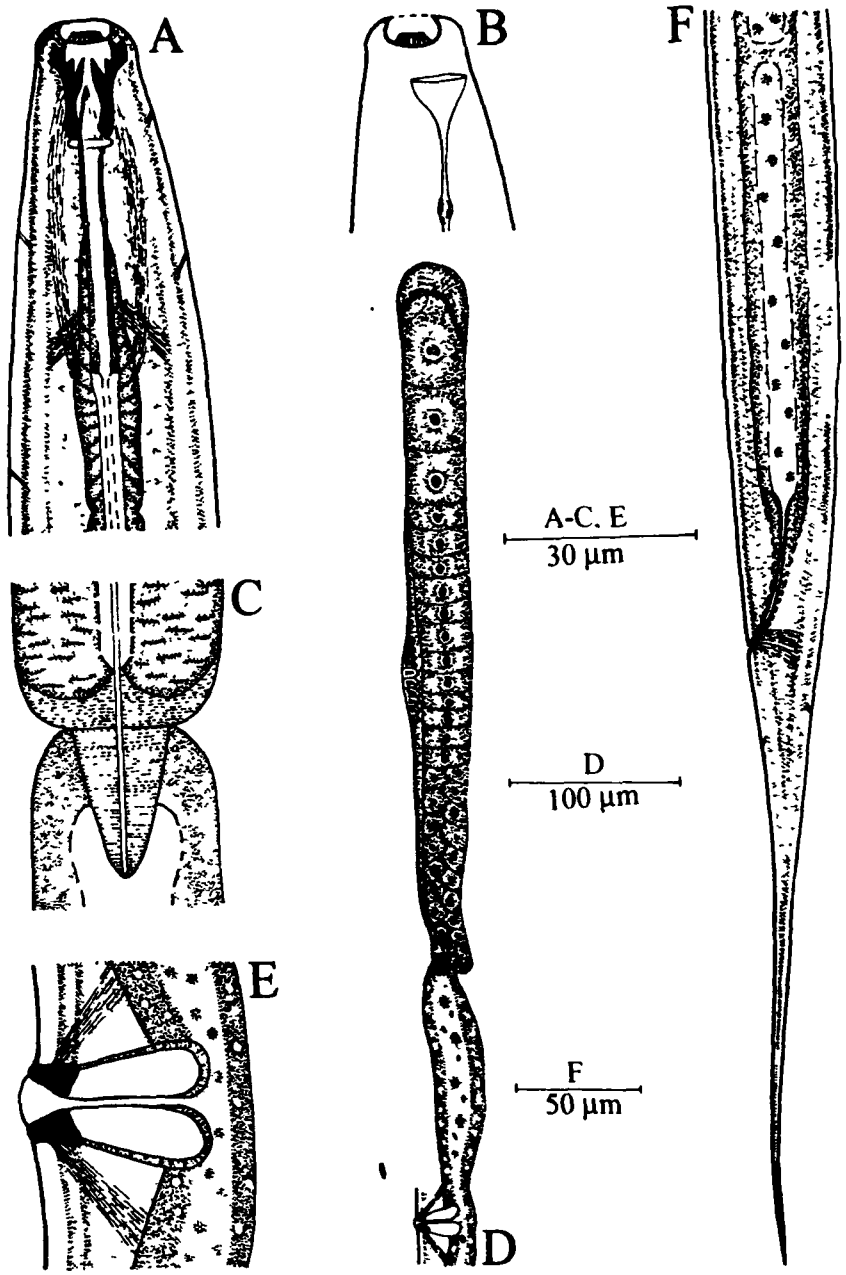

Fig. 7. ***Neoactinolaimus protrudus*** n.sp. A Anterior region; B. Anterior region showing amphid, C. Oesophago-intestinal junction, D. Female gonad (anterior); E Vulval region; F. Female posterior region.

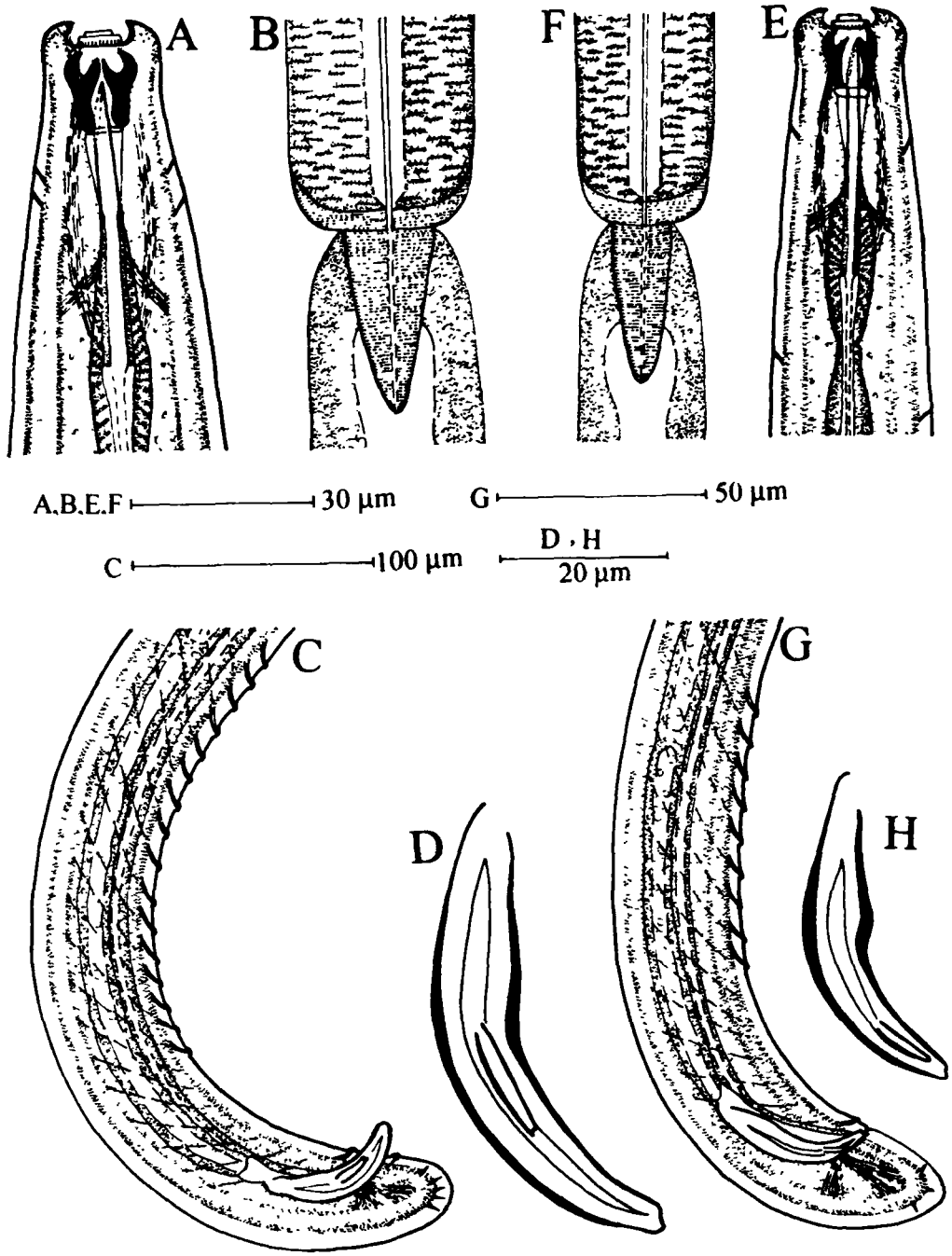

Fig. 8. ***Egtitus kodagus*** n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Male posterior region; D. Spicule.
Egtitus nethrus n.sp. E. Anterior region; F. Oesophago - intestinal junction; G. Male posterior region; H. Spicule.

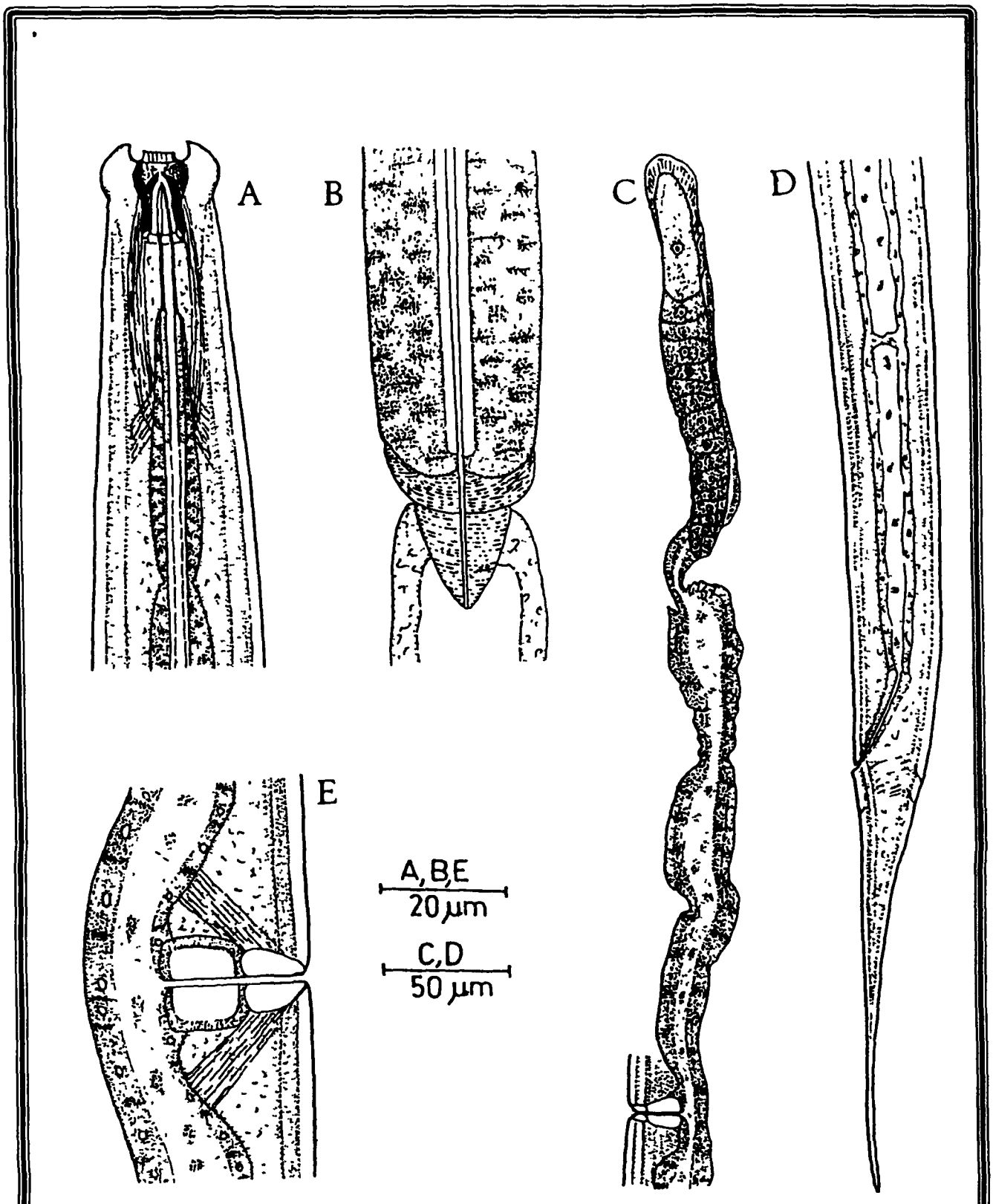

Fig. 9. *Paractinolaimus chiki* n sp A Anterior region, B Oesophago-intestinal junction, C Female gonad (anterior), D Female posterior region, E Vulval region

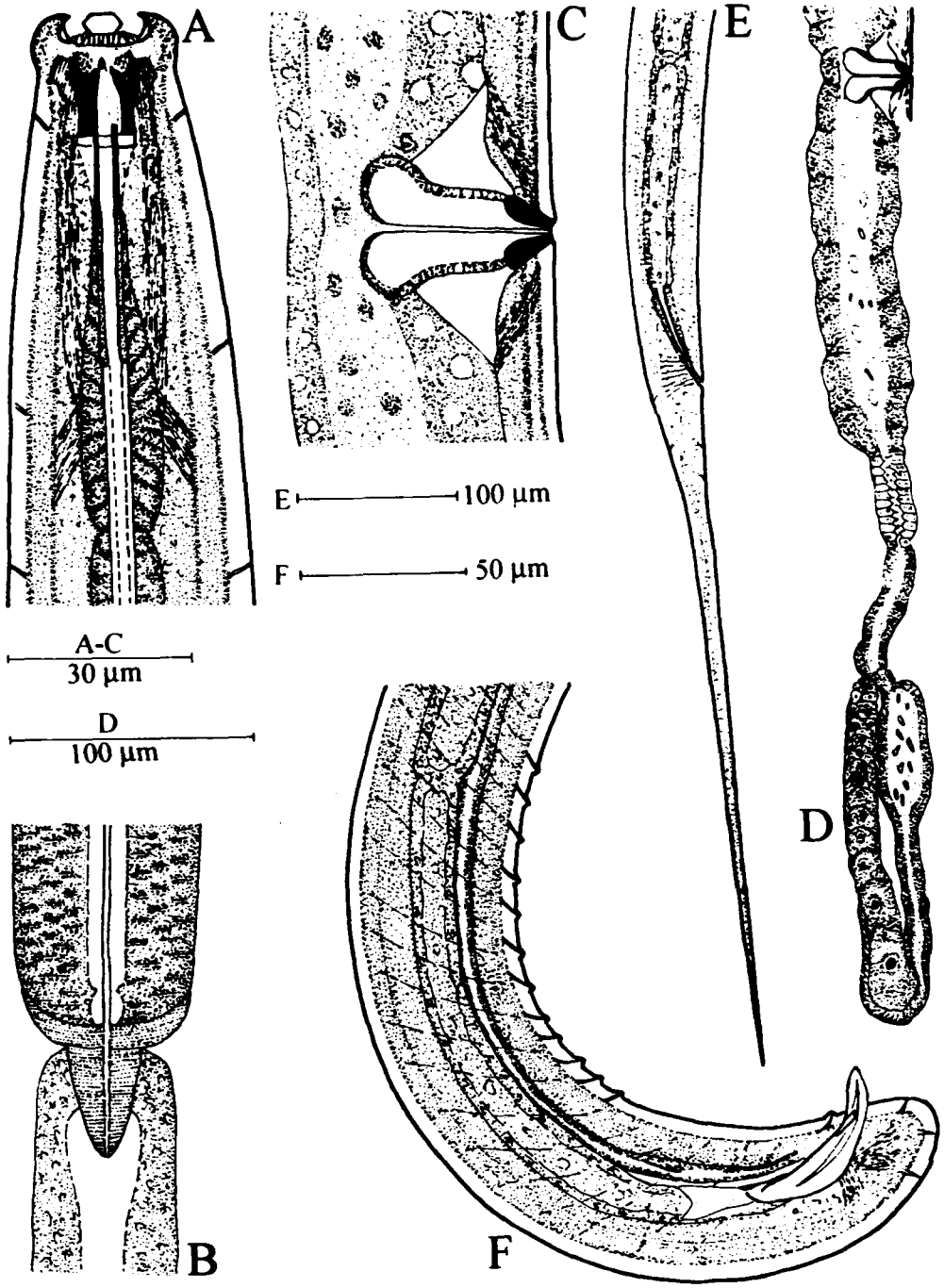

Fig. 10. ***Paractinolaimoides longicaudatus*** n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Vulval region; D. Female gonad (posterior); E. Female posterior region; F. Male posterior region;

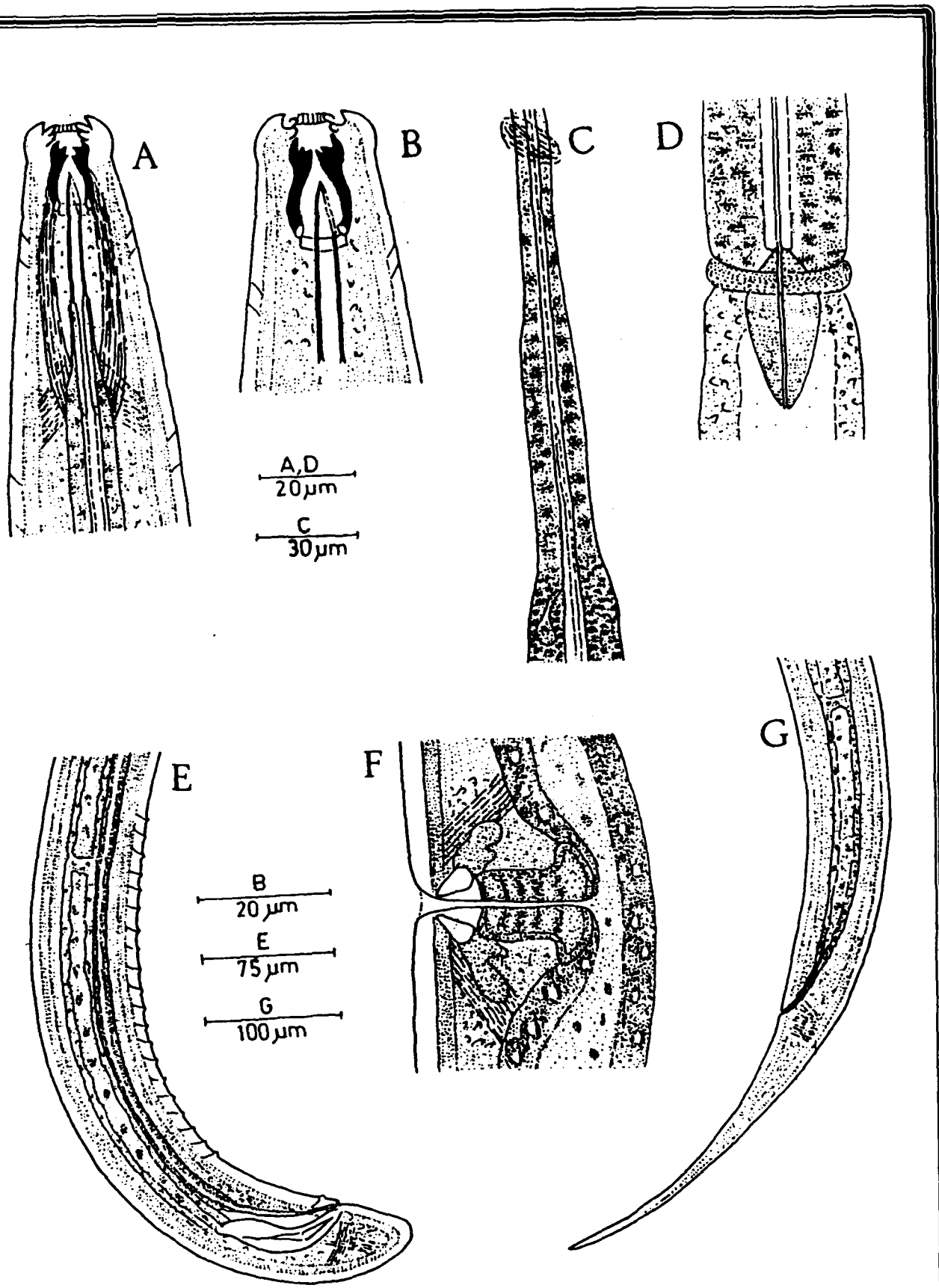

Fig. 11. ***Stopractinca malnadensis*** n.sp. A&B. Anterior region; C. Middle region of oesophagus;D. Oesophago-intestinal junction; E. Male posterior region; F. Vulval region; G. Female posterior region.

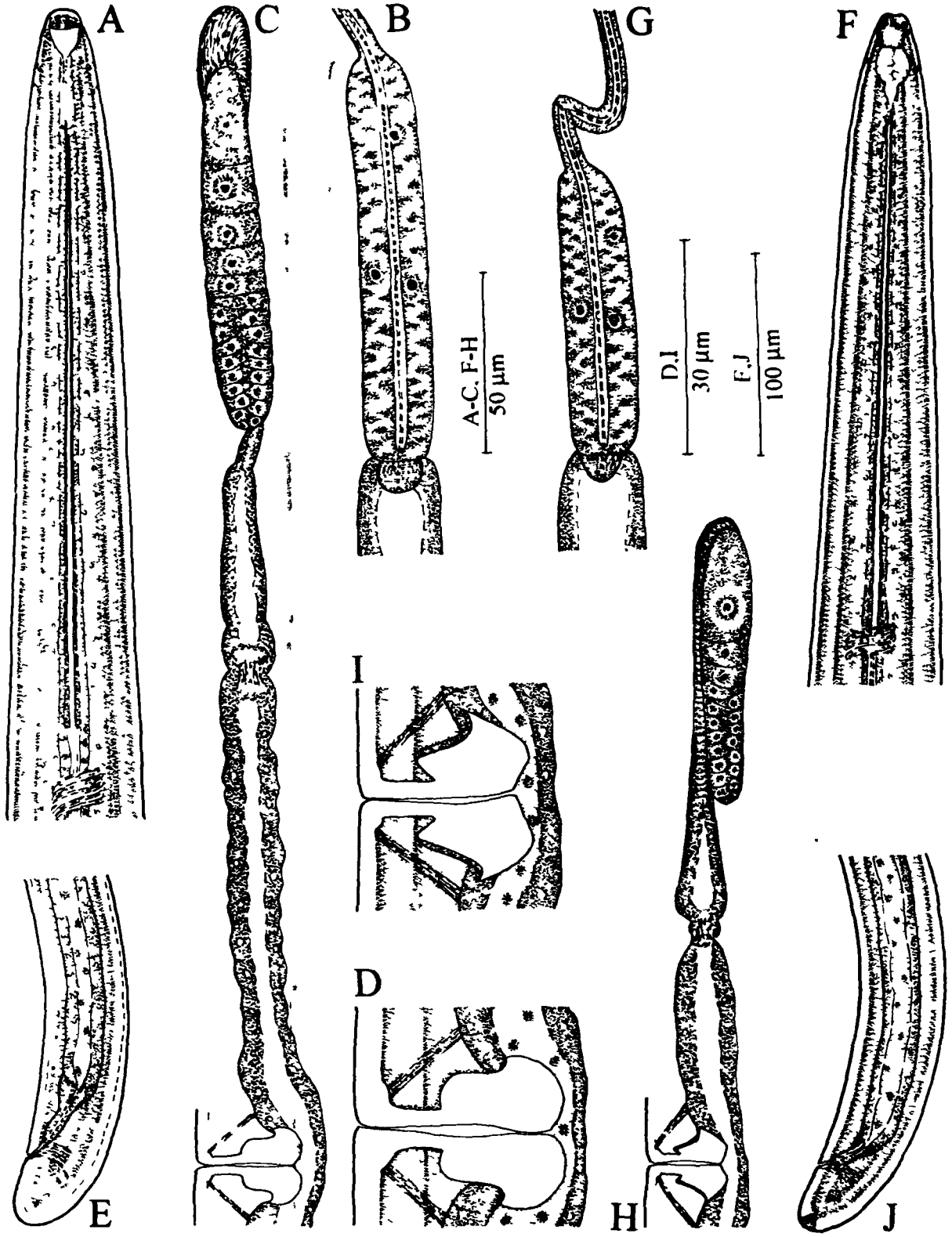

Fig 12. ***Paralongidorus ciaressi*** n sp A Anterior region, B Basal expanded part of oesophagus and oesophago-intestinal junction, C Female gonad (anterior), D Vulval region, E Female posterior region
Longidorus indicus n sp F Anterior region, G Basal expanded part of oesophagus and oesophago-intestinal junction, H Female gonad (anterior), I Vulval region, J Female posterior region

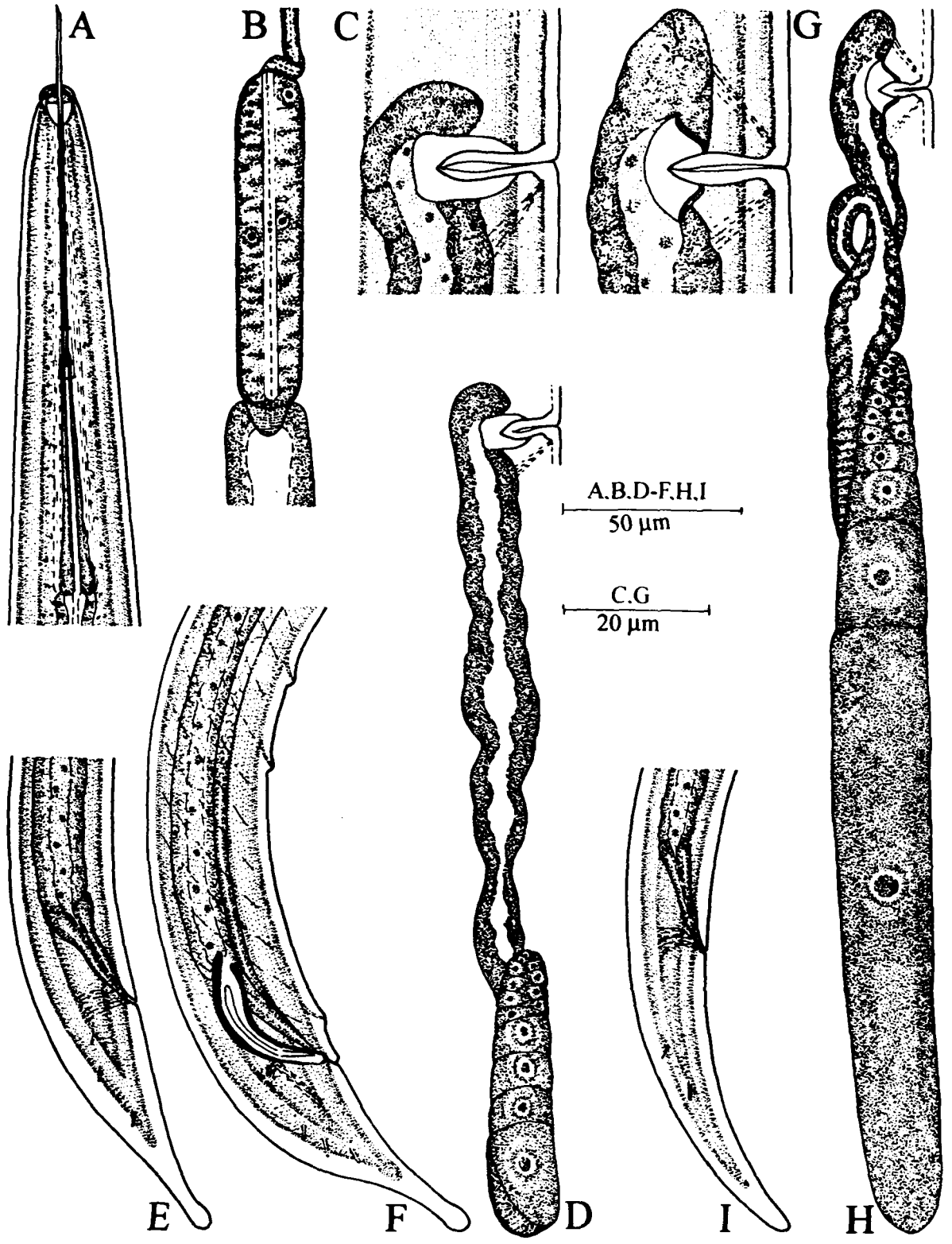

Fig. 13. ***Xiphinema dimorphis*** n.sp. A. Anterior region; B. Basal expanded part of oesophagus and oesophgo-intestinal junction; C. *Vulval region*; D. *Female genital branch*; E. Female posterior region; F. Male posterior region.
Xiphinema simillum G. Vulval region; H. Female genital branches; I. Female posterior region.

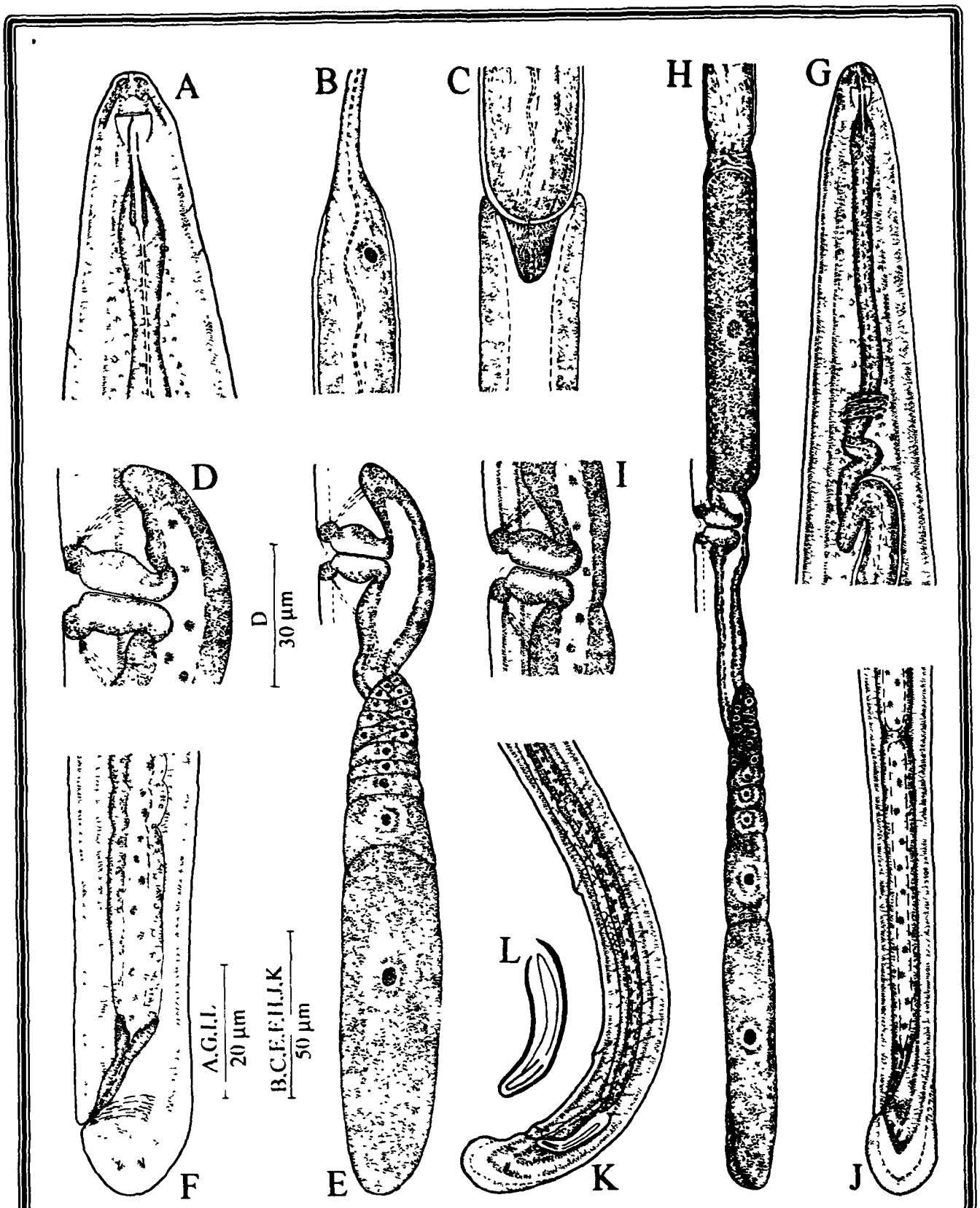

Fig. 14. ***Belondira beluri*** n.sp. A Anterior region; B Oesophageal expansion, C Oesophago-intestinal junction; D Vulval region; E Female genital branches. F. Female posterior region.
Belondira ovatum n.sp. G. Anterior region; H. Oesophgo - intestinal junction and female genital branches; I. Vulval region; J. Female posterior region. K. Male posterior region; L. Spicule.

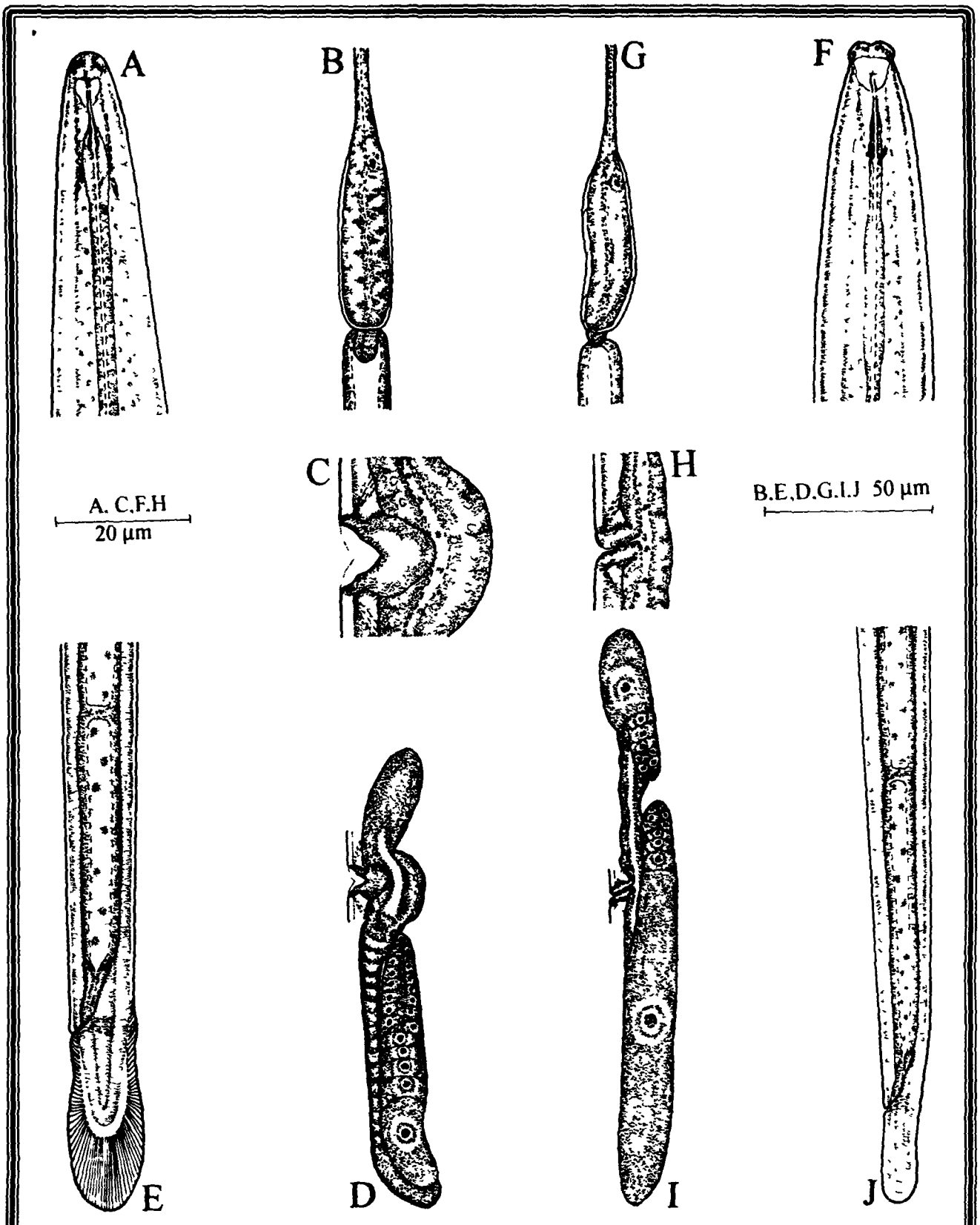

Fig. 15. ***Belondira paratumicauda*** n.sp A Anterior region, B Basal expanded part of oesopahgus and oesophago - intestinal junction, C Vulval region, D. Female genital branches; E Female posterior region ***Nygellolaimellus muthi*** n.subgen , n.sp. F. Anterior region, G Basal expanded part of oesopahgus and oesophago - intestinal junction, H Vulval region; I. Female genital branches; J Female posterior region

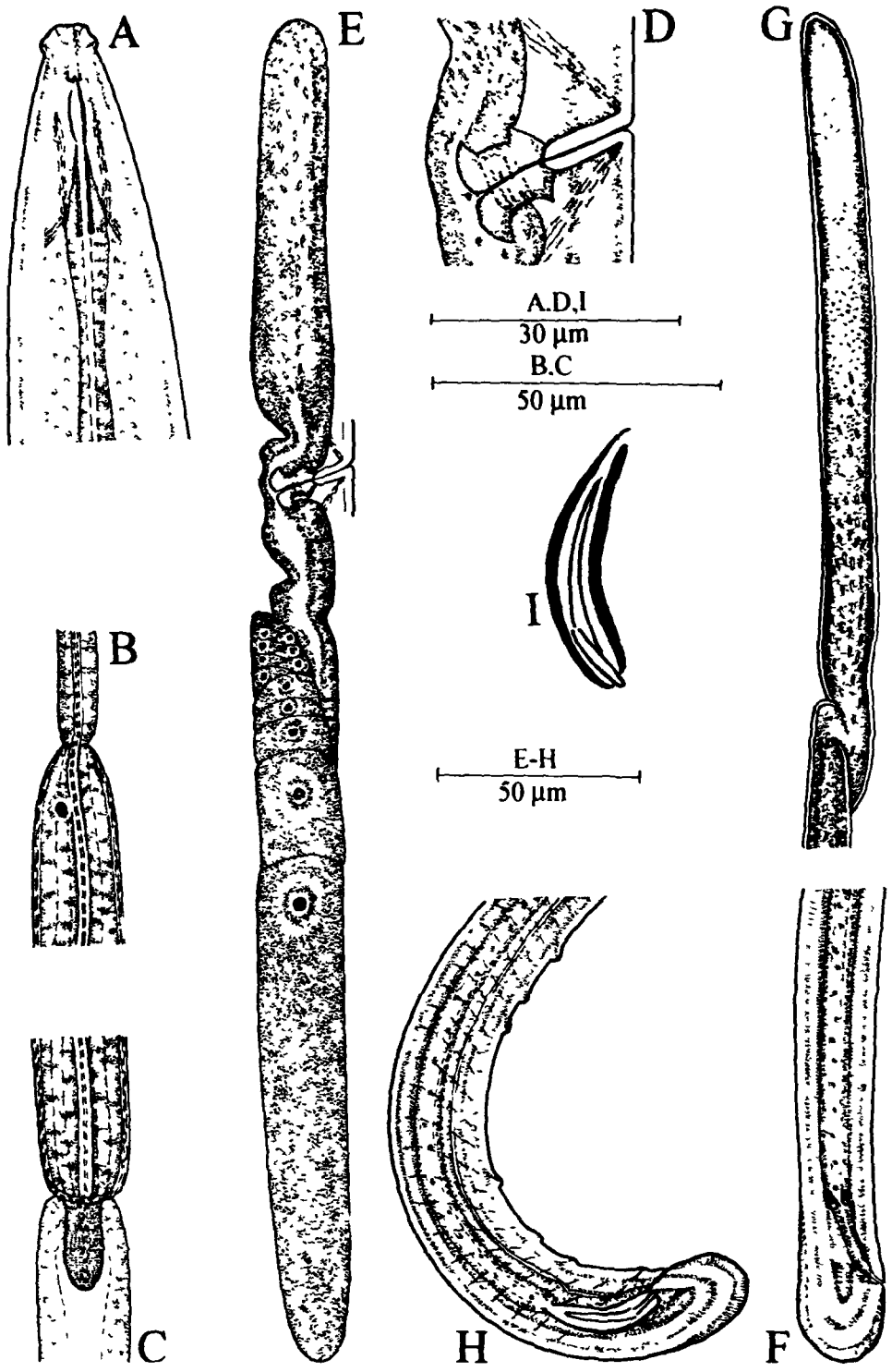

Fig. 16. ***Axonchium cooverkolli*** n.sp A. Anterior region, B. Oesophageal constriction; C Oesophago-intestinal junction; D Vulval region, E Female genital branches, F Female posterior region, G Male gonad (anterior part of testes showing muscular sheath); H Male posterior region; I. Spicule.

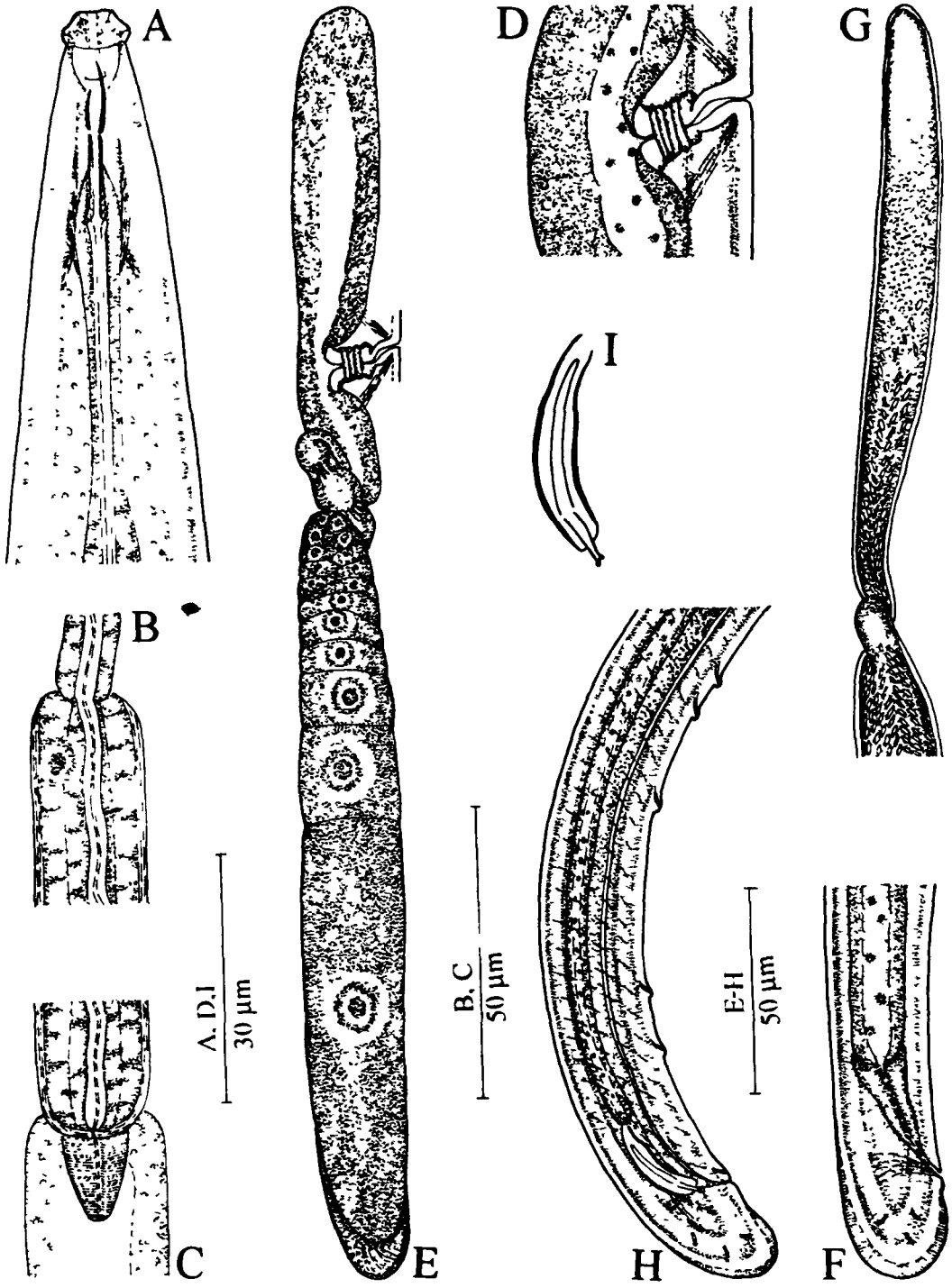

Fig. 17. *Axonchium hosakodii* n.sp.A. Anterior region, B. Oesophageal constriction; C. Oesophago-intestinal junction, D. Vulval region, E Female genital branches; F. Female posterior region; G Male gonad (anterior part of testes showing muscular sheath); H Male posterior region; I. Spicule.

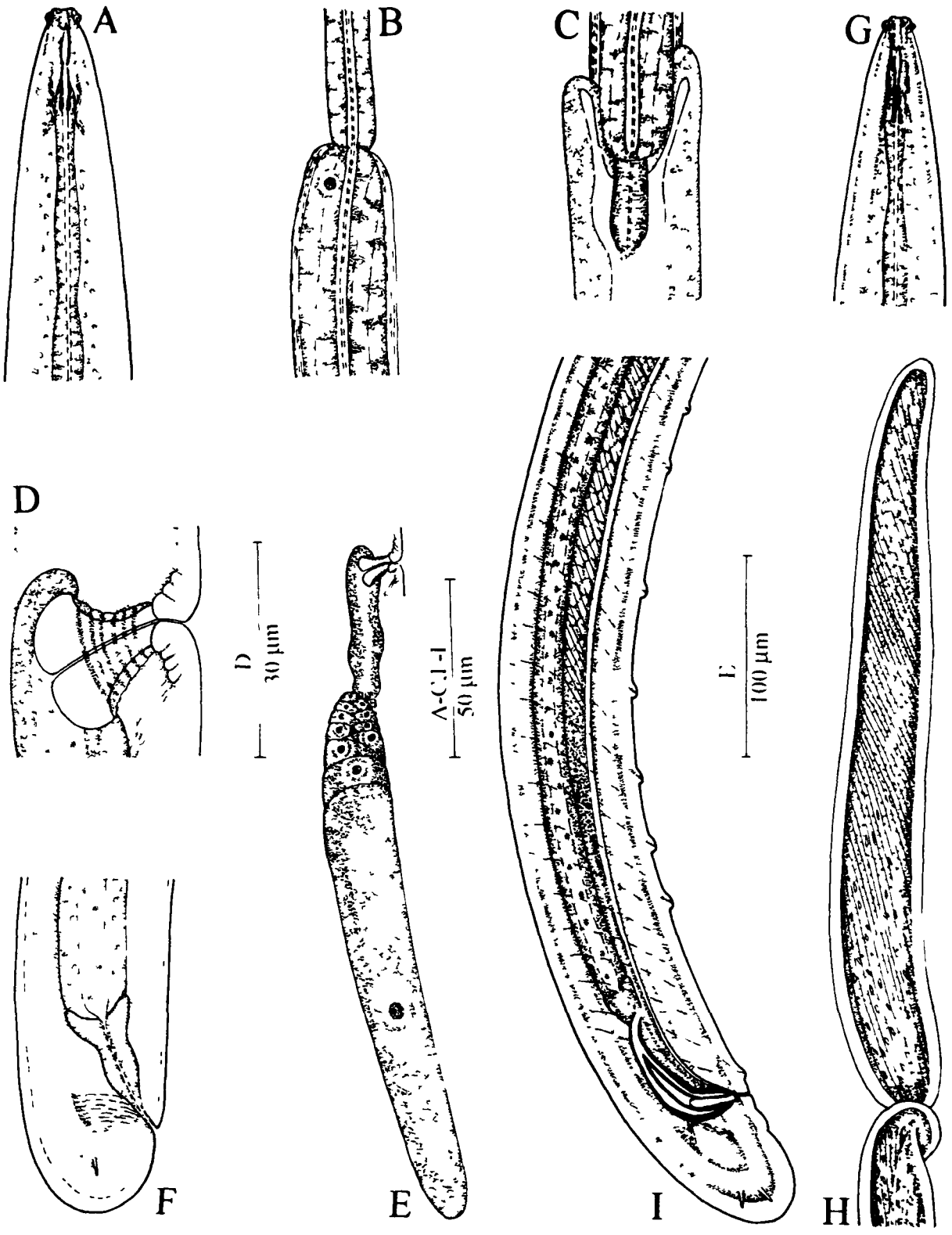

Fig. 18. ***Axonchium camelliae*** n sp A Anterior region, B Oesophageal constriction, C Oesophago-intestinal junction, D Vulval region, E Female genital branch, F Female posterior region
Axonchium heynsi G Anterior region, H Male gonad (anterior part of testes showing muscular sheath and oblique bands), I Male posterior region

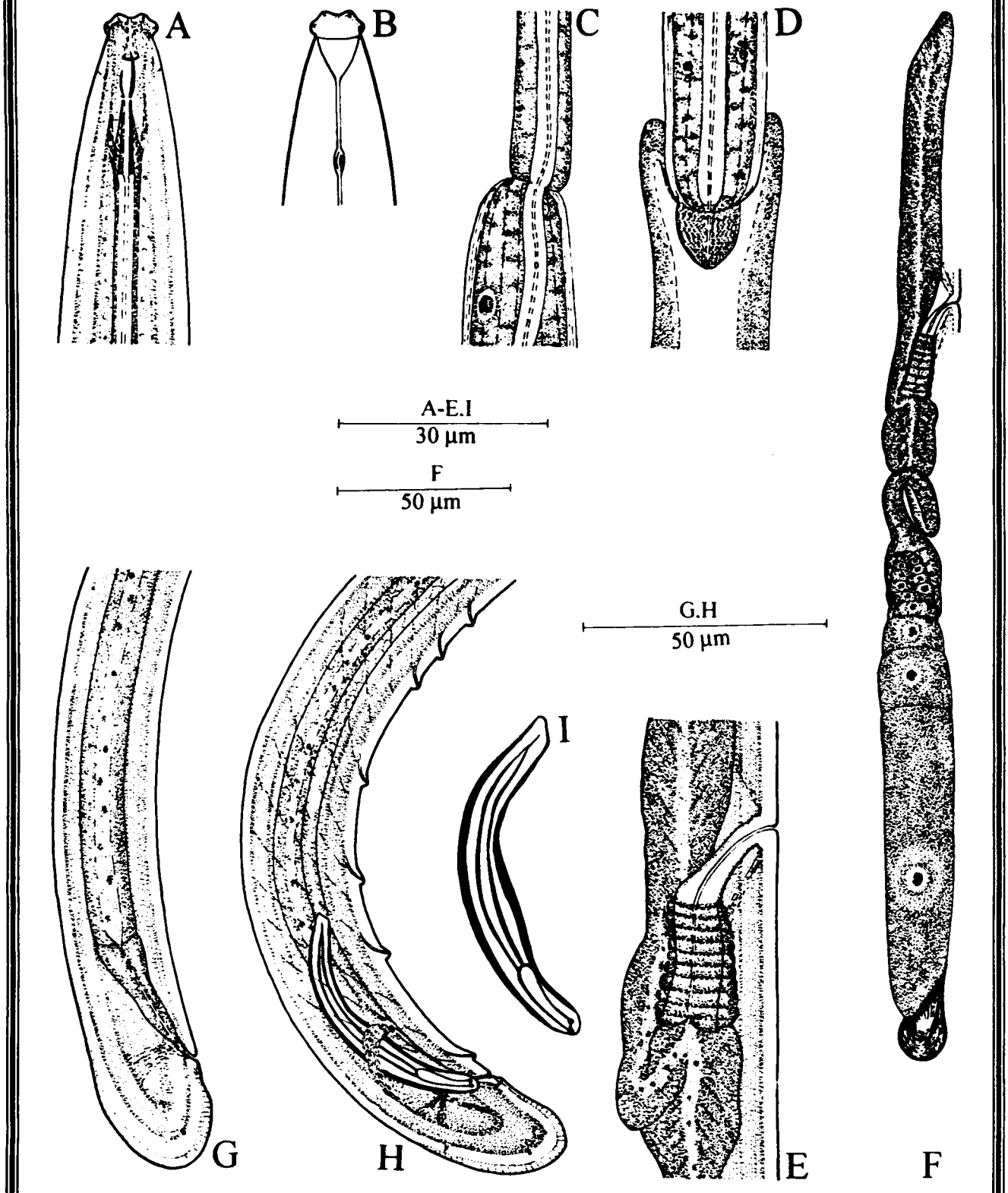

Fig. 19. ***Uniqaxonchium megaspiculum*** n.subgen., n.sp. A. Anterior region; B. Anterior region showing amphid; C. Oesophageal constriction; D. Oesophago-intestinal junction; E. Vulval region; F. Female genital branches; G. Female posterior region; H. Male posterior region; I. Spicule.

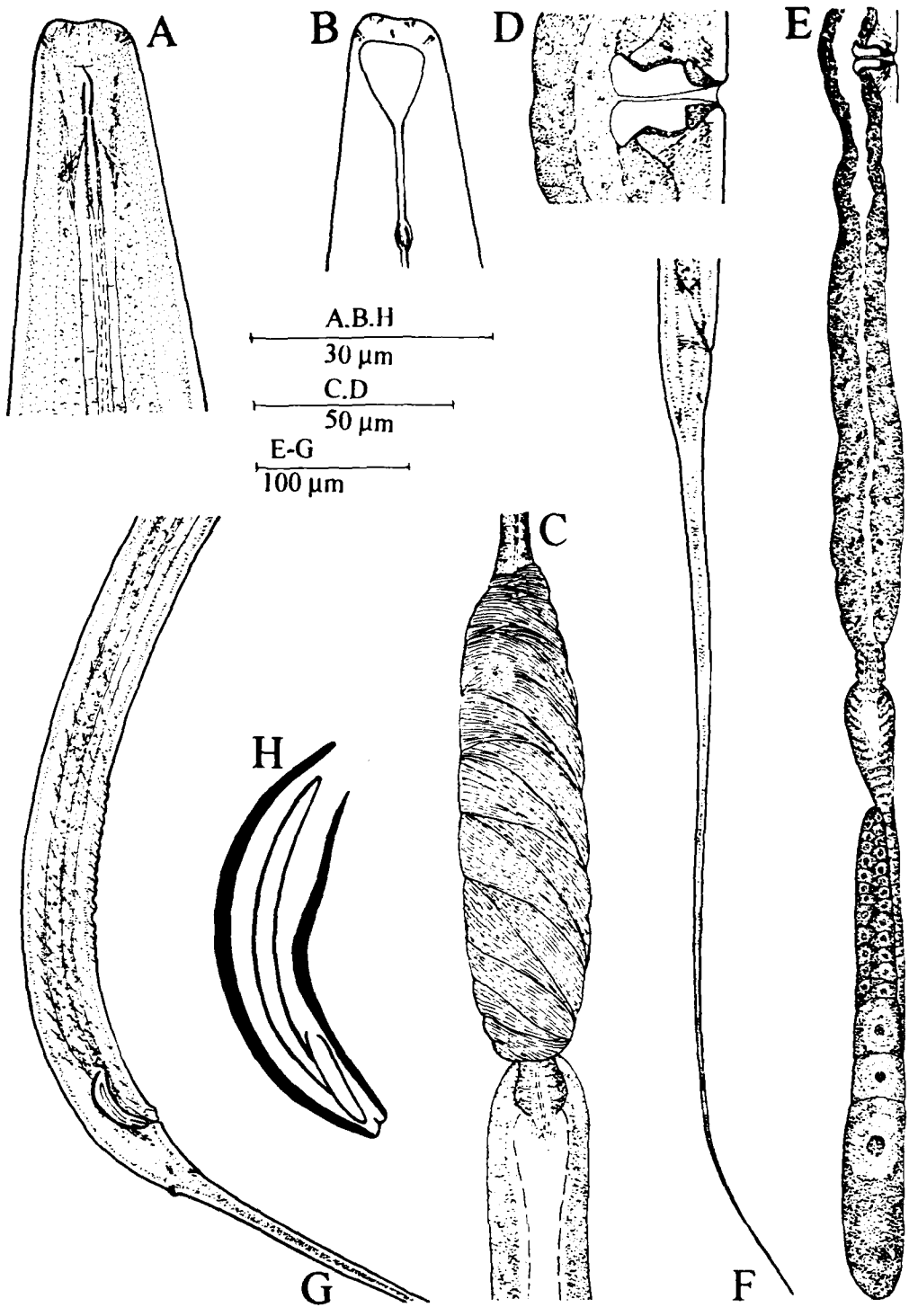

Fig. 20. ***Paraoxydirus abnormus*** n.sp. A. Anterior region; B. Anterior region showing amphid; C. Basal expanded part of oesophagus and oesophago-intestinal junction; D. Vulval region; E. Female gonad (posterior); F. Female posterior region; G. Male posterior region; H. Spicule.

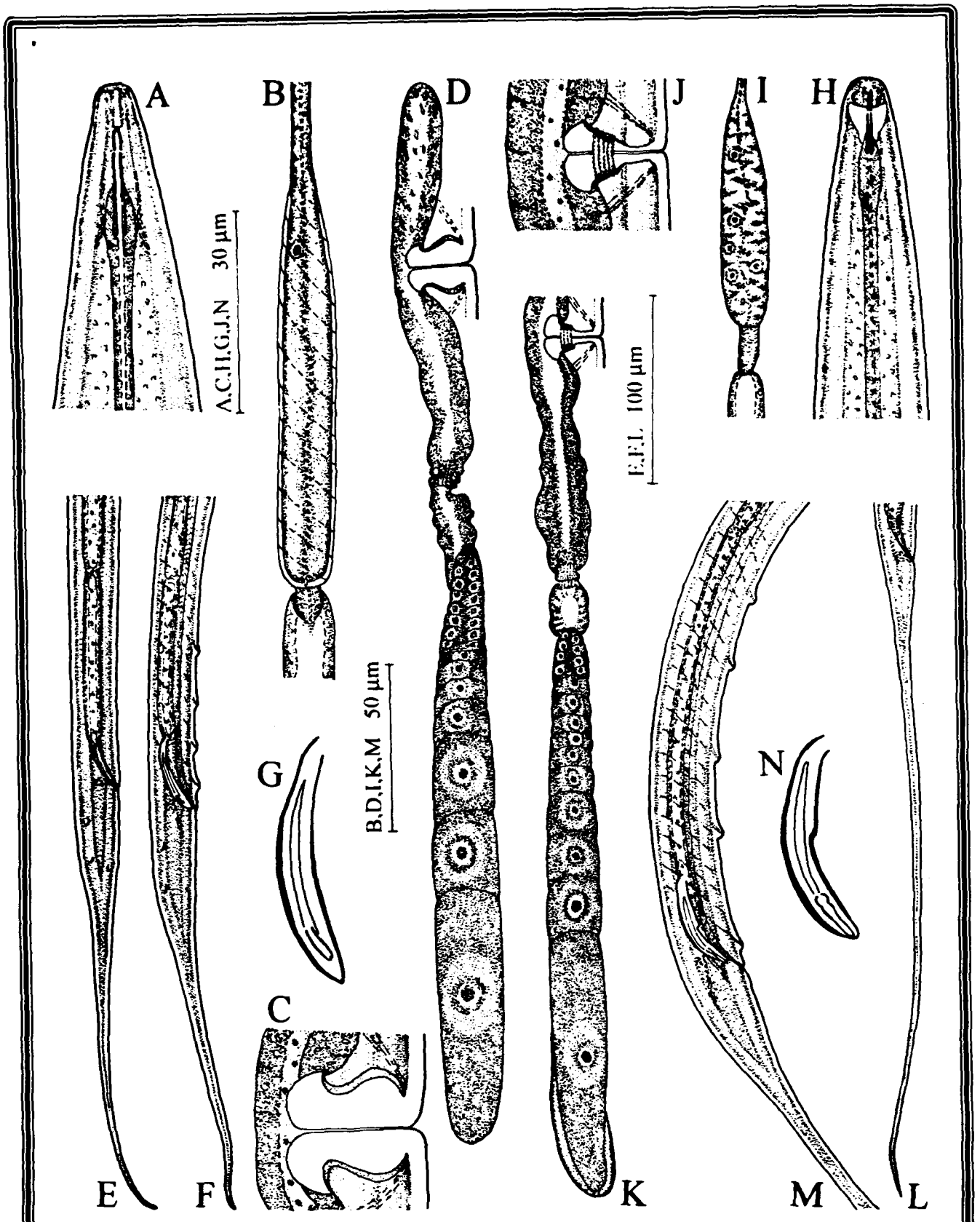

Fig. 21. ***Paraoxybelondira mayili*** n.gen., n.sp. A. Anterior region; B. Basal expanded part of oesophagus and oesophago-intestinal junction; C. Vulval region; D. Female genital branches; E. Female posterior region; F. Male posterior region; G. Spicule. ***Duriella elongatus*** n.gen., n.sp. H. Anterior region; I. Basal expanded part of oesophagus and oesophago-intestinal junction ; J. Vulval region; K. Female gonad (posterior); L. Female posterior region; M. Male posterior region; N. Spicule.

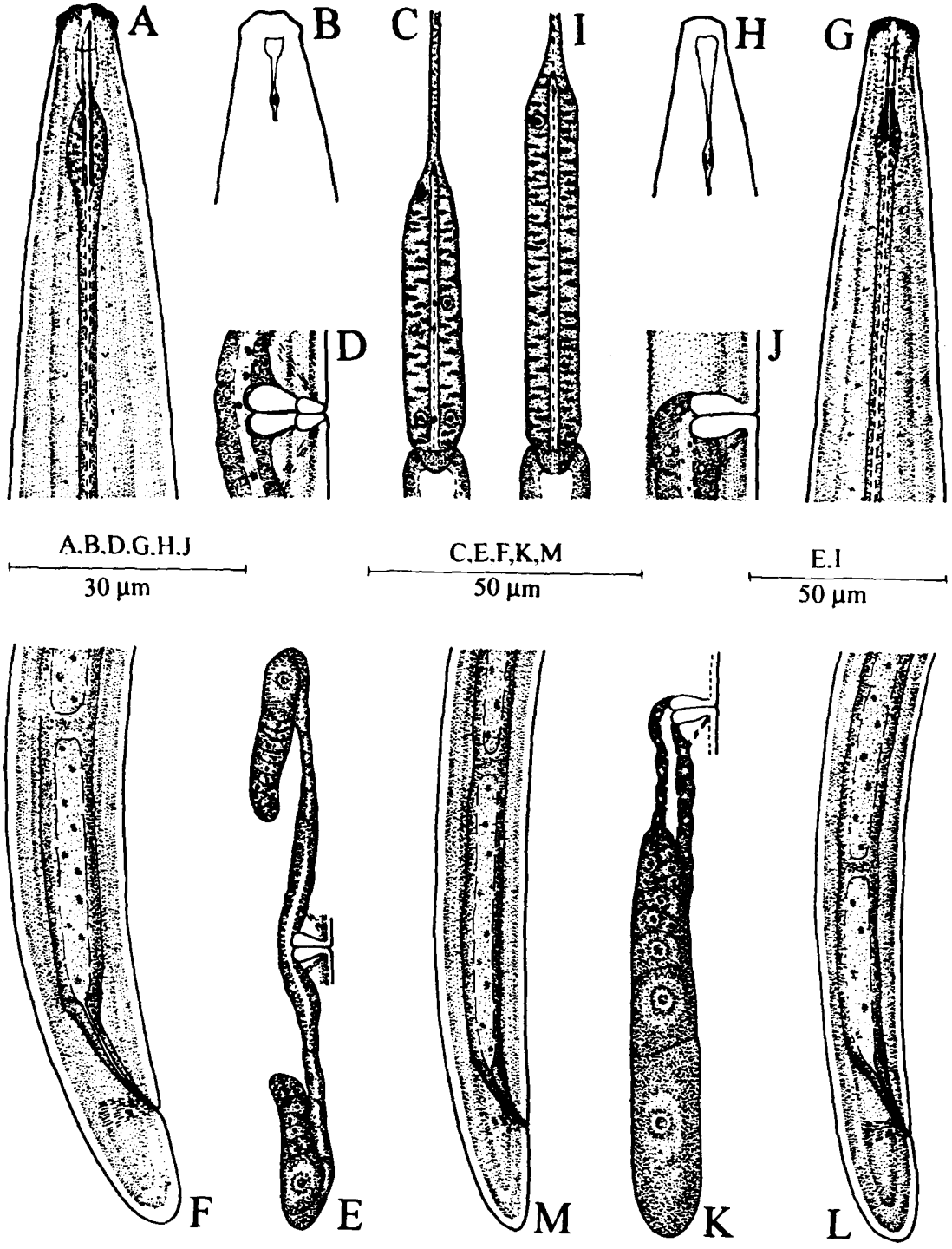

Fig. 22. ***Amphitylencholaimus cosmos*** n.sp. A. Anterior region; B. Anterior region showing amphid; C. Basal expanded part of oesophagus and oesophago-intestinal junction ; D. Vulval region; E. Female genital branches; F. Female posterior region. ***Opisthotylencholaimus karnataki*** n.sp. G. Anterior region; H. Anterior region showing amphid; I. Basal expanded part of oesophagus and oesophago-intestinal junction ; J. Vulval region; K. Female genital branch; L. Female posterior region. ***Tylencholaimus ibericus*** M. Female posterior region.

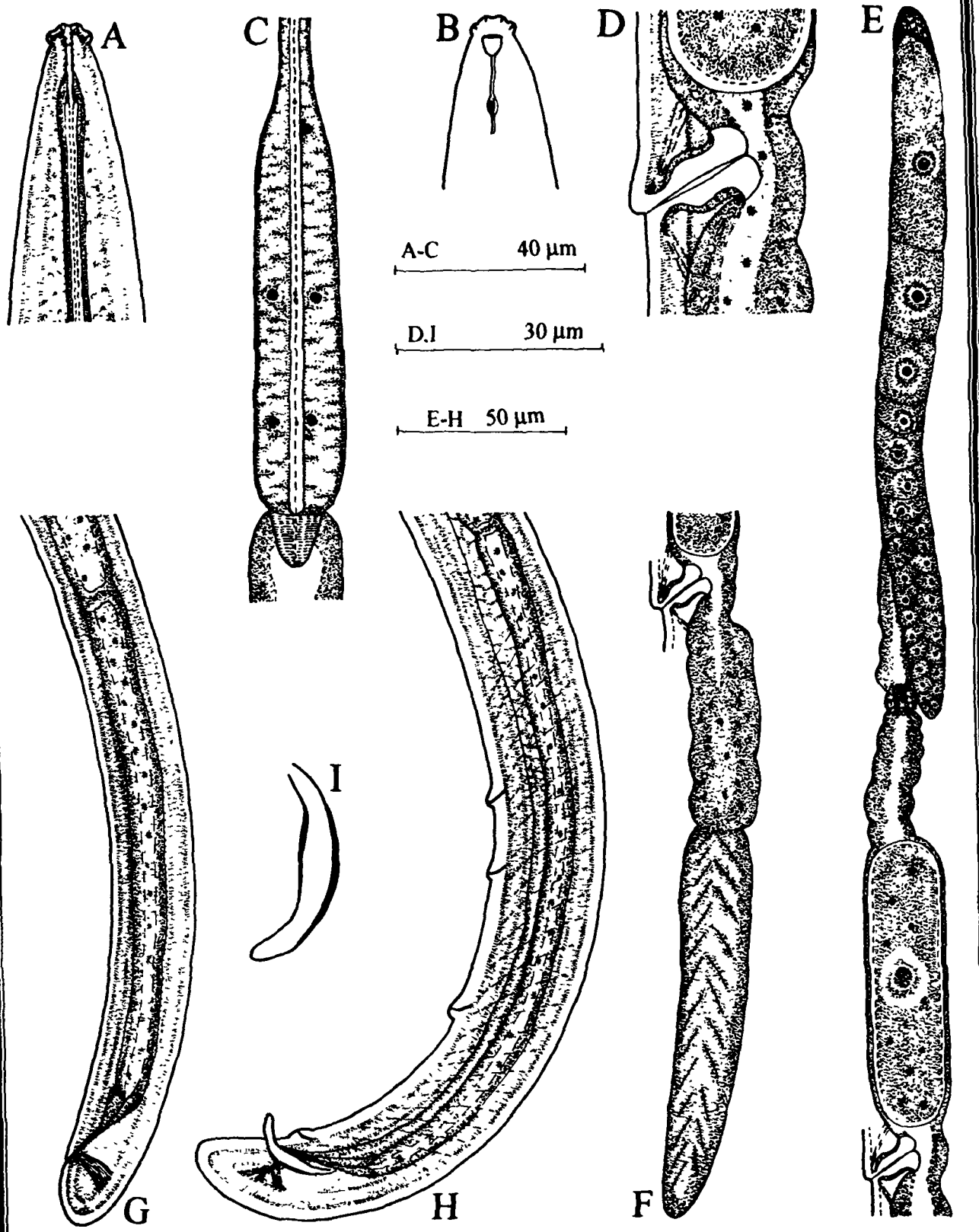

Fig. 23. ***Protylencholaimus longisacca*** n.sp. A. Anterior region; B. Anterior region showing amphid; C. Basal expanded part of oesophagus andoesophago-intestinal junction; D. Vulval region; E. Female gonad (anterior); F. Female gonad (posterior uterine sac);G. Female posterior region; H. Male posterior region; I. Spicule.

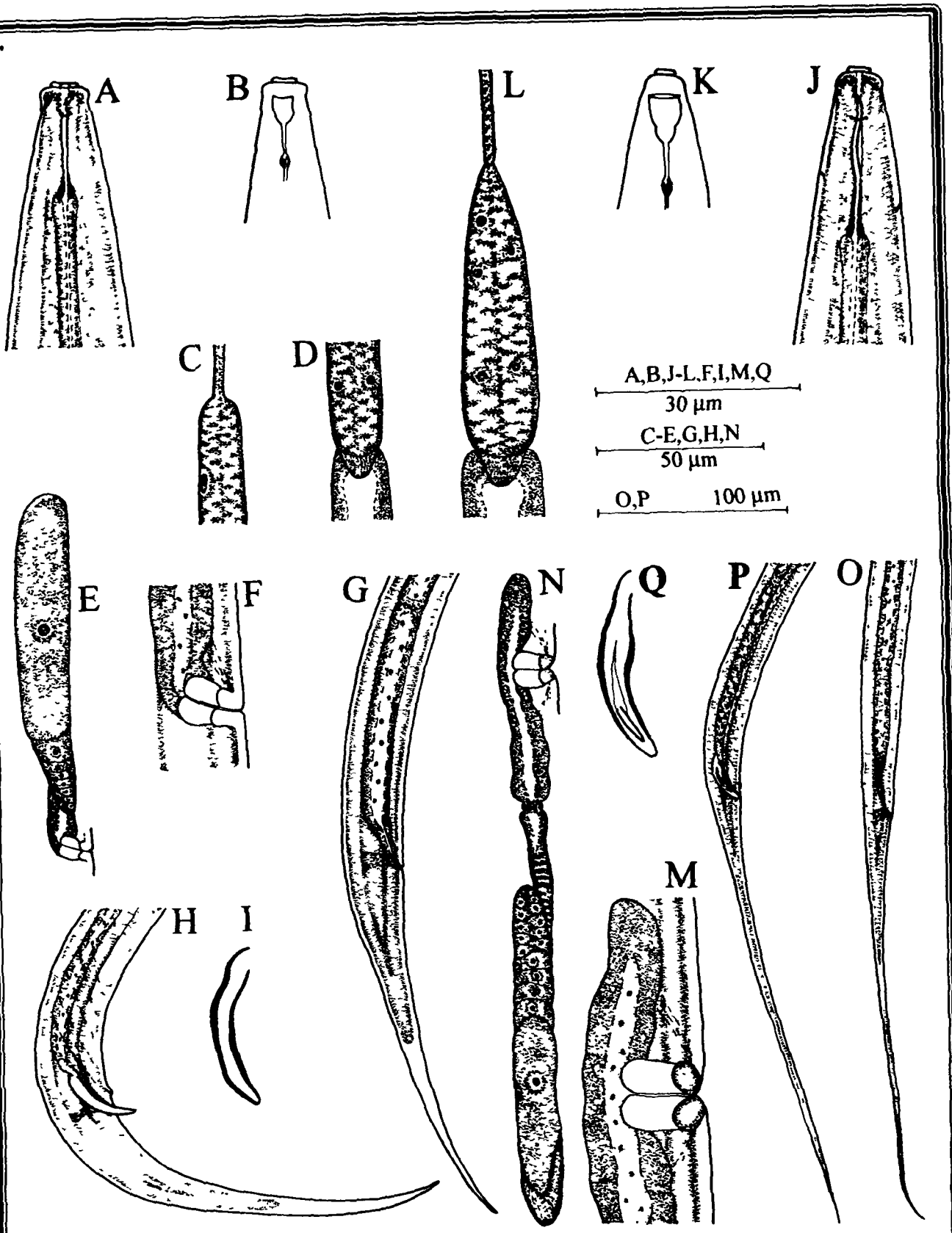

Fig. 24. ***Discomyctus bisexualis*** n sp A Anterior region, B Anterior region showing amphid,C Oesophageal expansion, D oesophago-intestinal junction, E Female genital branch,F Vulval region, G Female posterior region, H Male posterior region, I Spicule

Oostenbrinkiella ventrostylus n sp J Anterior region, K Anterior region showing amphid, L Basal expanded part of oesophagus and oesophago-intestinal junction, M Vulval region, N Female genital branches, O Female posterior region, P Male posterior region, Q Spicule

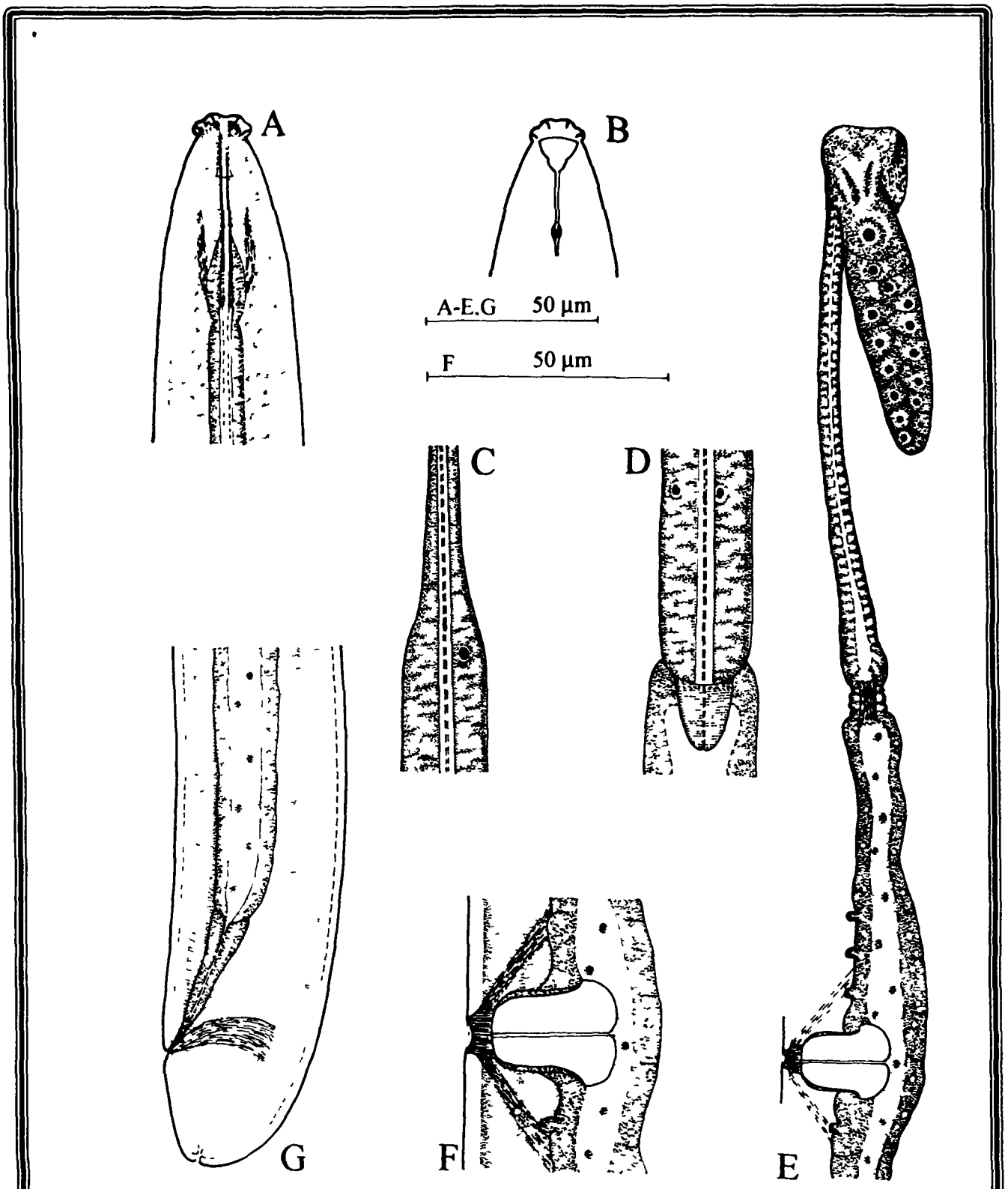

Fig. 25. ***Chitwoodius musae*** n sp A Anterior region, B Anterior region showing amphid, C Oesophageal expansion, D Oesophago-intestinal junction, E Female gonad (anterior), F Vulval region, G Female posterior region

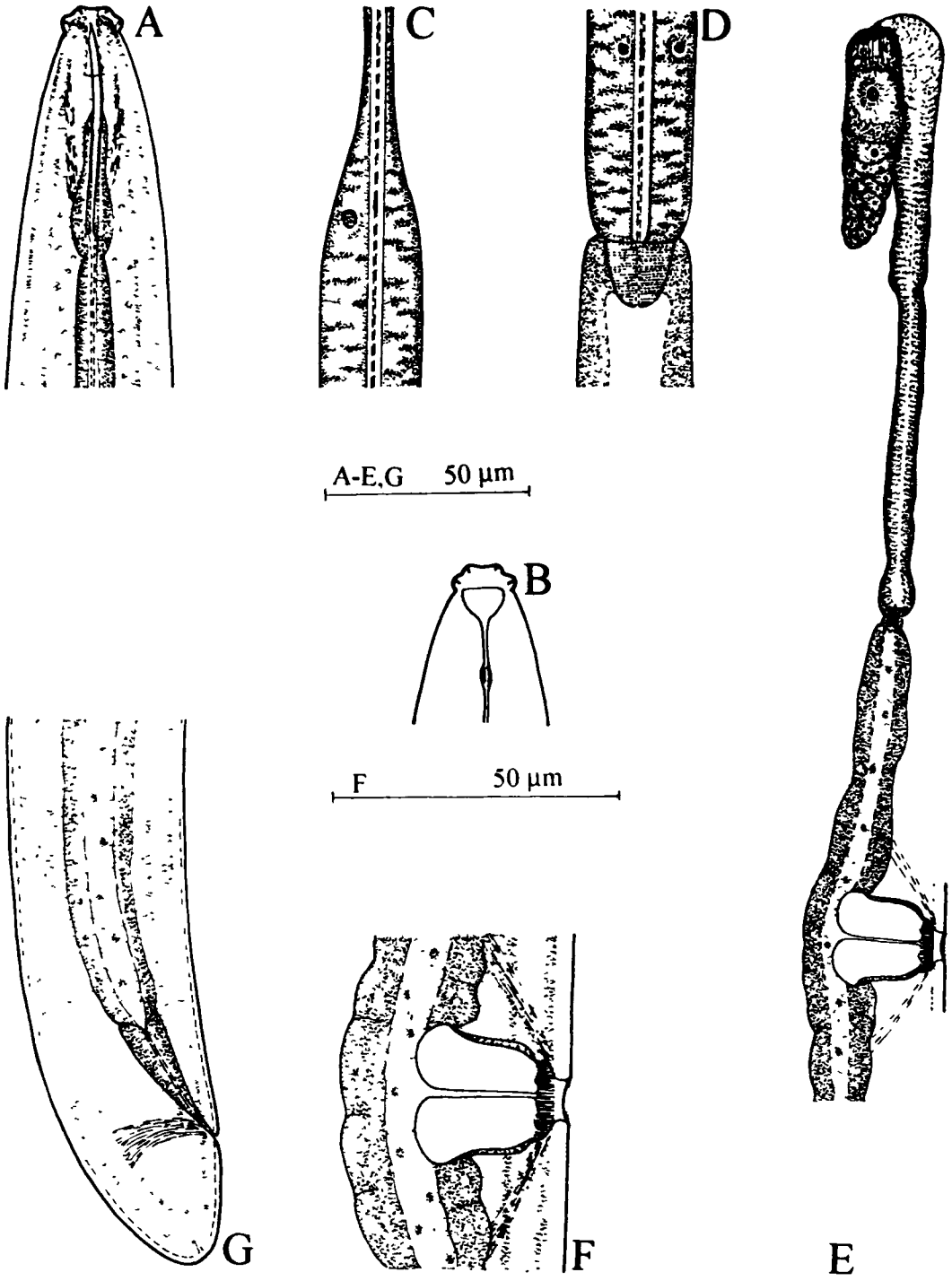

Fig. 26. ***Chitwoodius curvistylus*** n.sp. A. Anterior region, B. Anterior region showing amphid;C. Oesophageal expansion; D. Oesophago-intestinal junction; E. Female gonad (anterior); F. Vulval region; G Female posterior region.

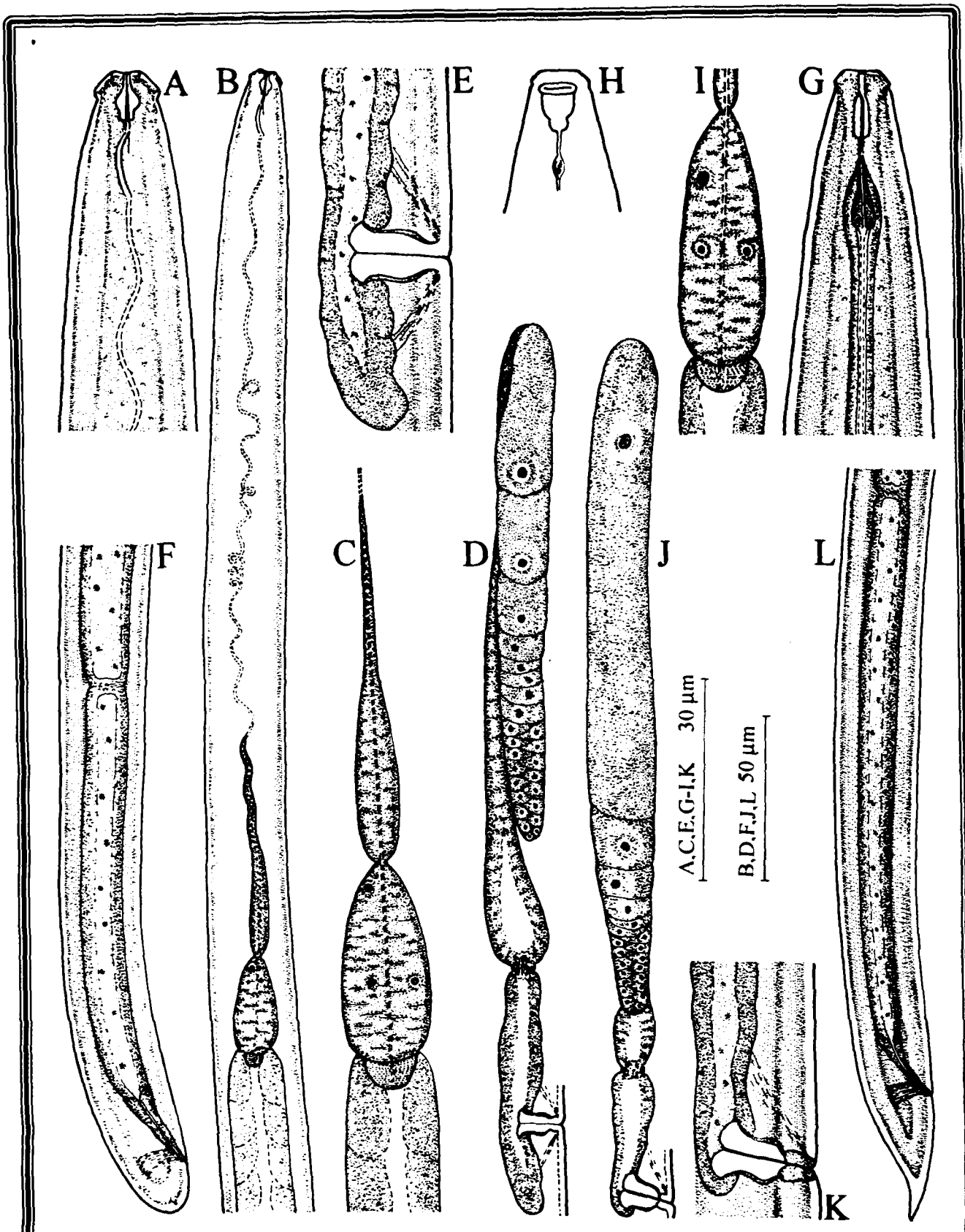

Fig. 27. ***Paraleptonchus convolusus*** n.gen., n.sp. A. Anterior region; B. Anterior region showing oesophagus and oesophago-intestinal junction; C. Basal expnaded part of oesophagus; D. Female genital branches; E. Vulval region; F. Female posterior region. ***Proleptonchoides equistylus*** n.sp. G. Anterior region; H. Anterior region showing amphid; I. Basal expnaded part of oesophagus and oesophago-intestinal junction; J. Female genital branch; K. Vulval region; L. Female posterior region.

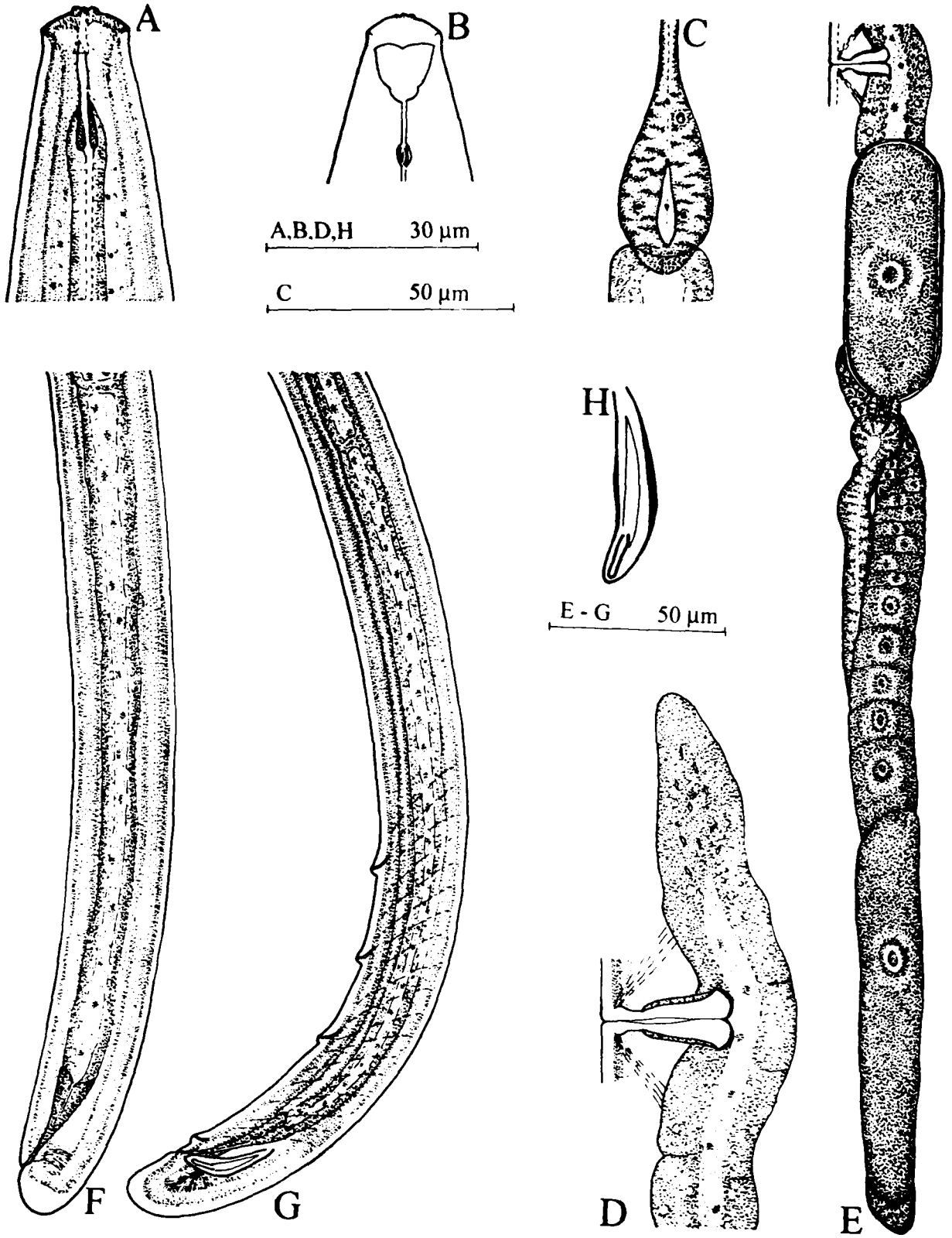

Fig. 28. *Tyleptus oryzae* n.sp. A. Anterior region; B. Anterior region showing amphid; C. Basal bulb and oesophago-intestinal junction; D. Vulval region; E. Female gonad (posterior); F. Female posterior region; G. Male posterior region; H. Spicule.

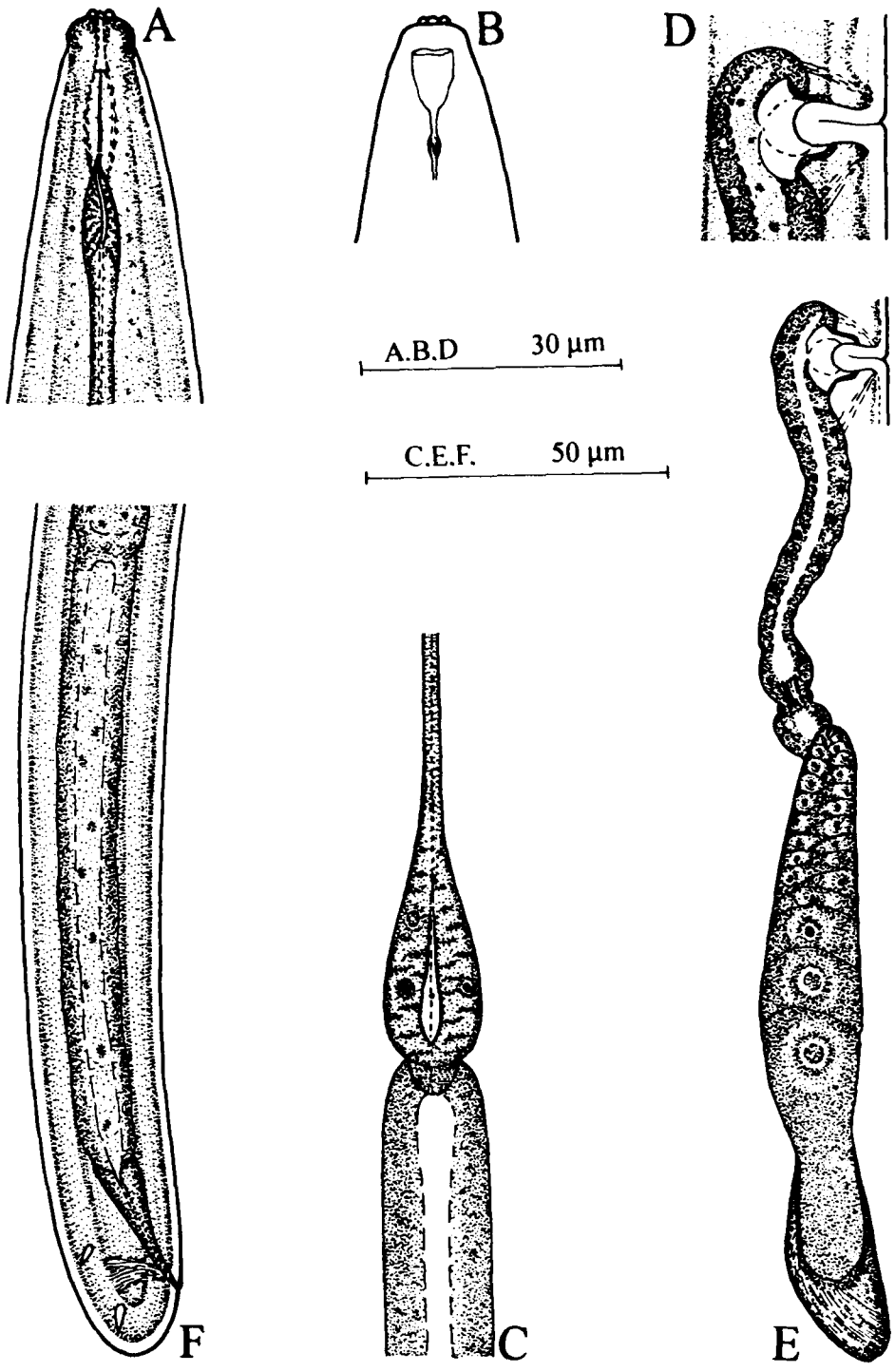

Fig. 29. ***Coronatyleptus indicus*** n.sp. A. Anterior region; B. Anterior region showing amphid;C. Basal bulb and oesophago-intestinal junction; D. Vulval region; E. Female genital branch; F. Female posterior region.

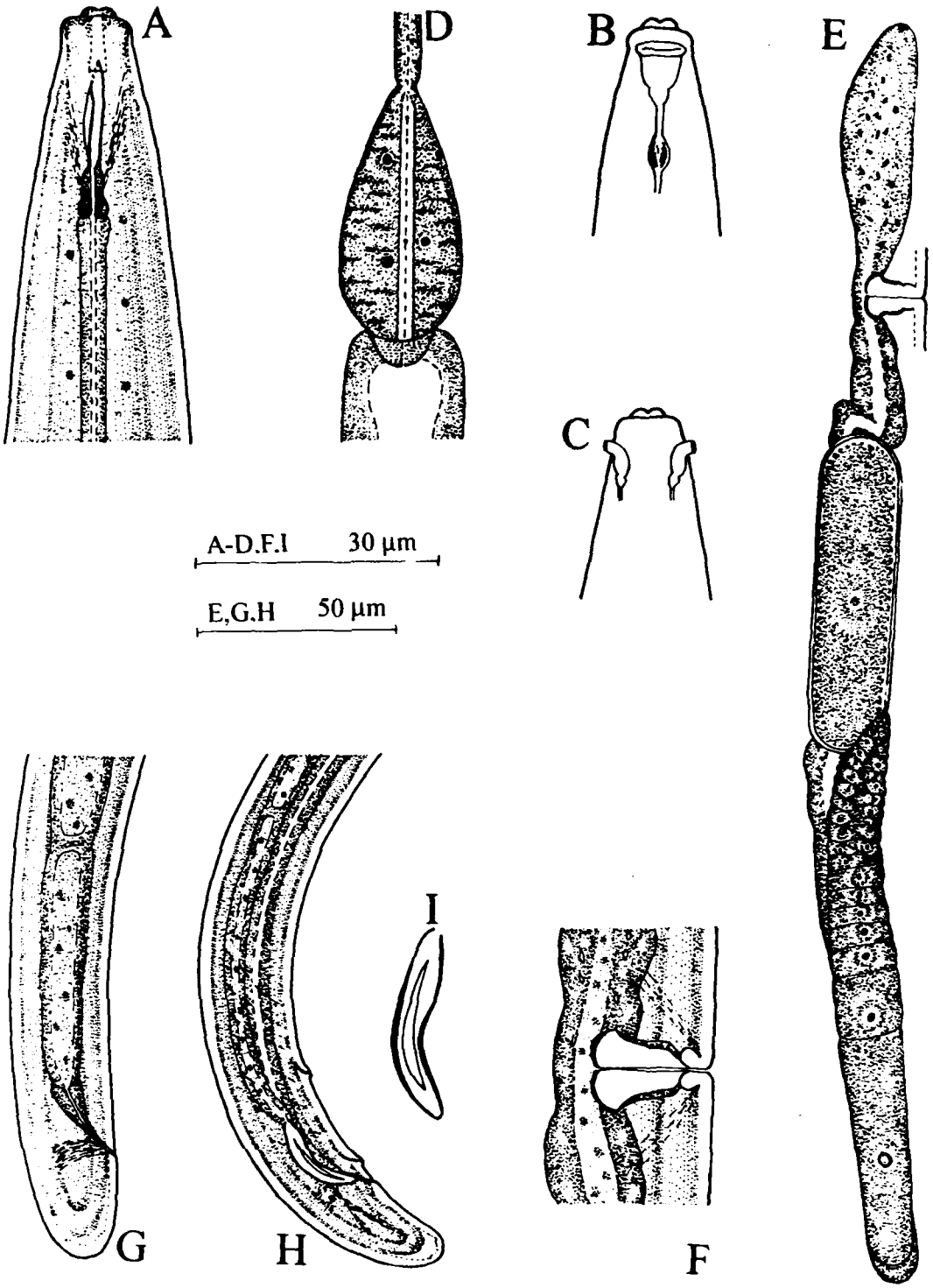

Fig. 30. *Coronatylencholaimellus amphidius* n.sp. A. Anterior region; B. Anterior region showing amphid; C. Dorso-ventral position of anterior region showing amphids; D. Basal bulb and oesophago-intestinal junction; E. Female genital branches; F. Vulval region; G. Female posterior region; H. Male posterior region; I. Spicule.

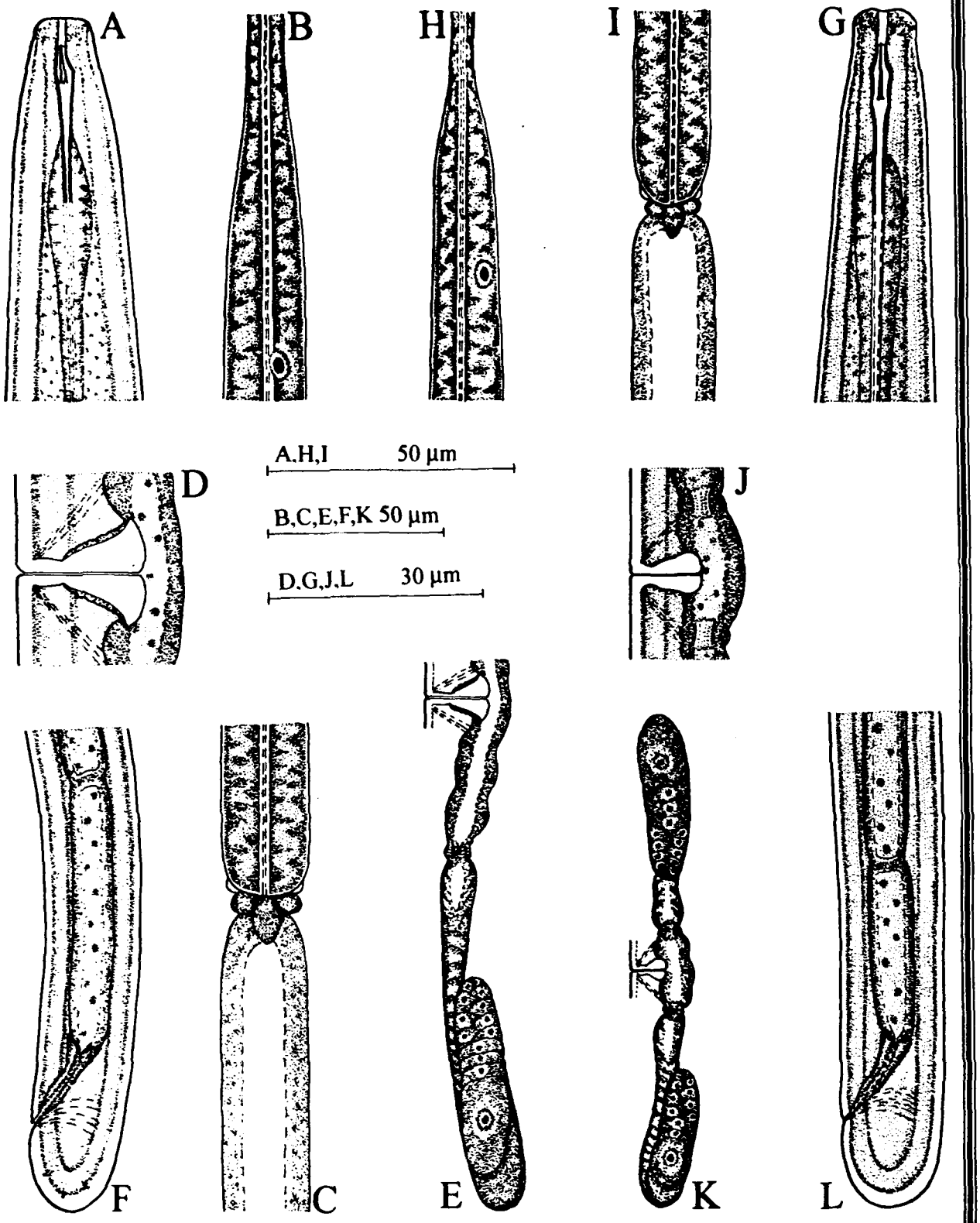

Fig. 31. ***Clavicaudoides paratrophurus*** n.sp. A. Anterior region; B. Oesophageal expansion; C. Oesophago-intestinal junction; D. Vulval region; E. Femalegonad (posterior); F. Female posterior region. ***Aquatides minutus*** n.sp. G. Anterior region; H. Oesophageal expansion; I. Oesophago-intestinal junction; J. Vulval region; K. Female genital branches; L. Female posterior region.

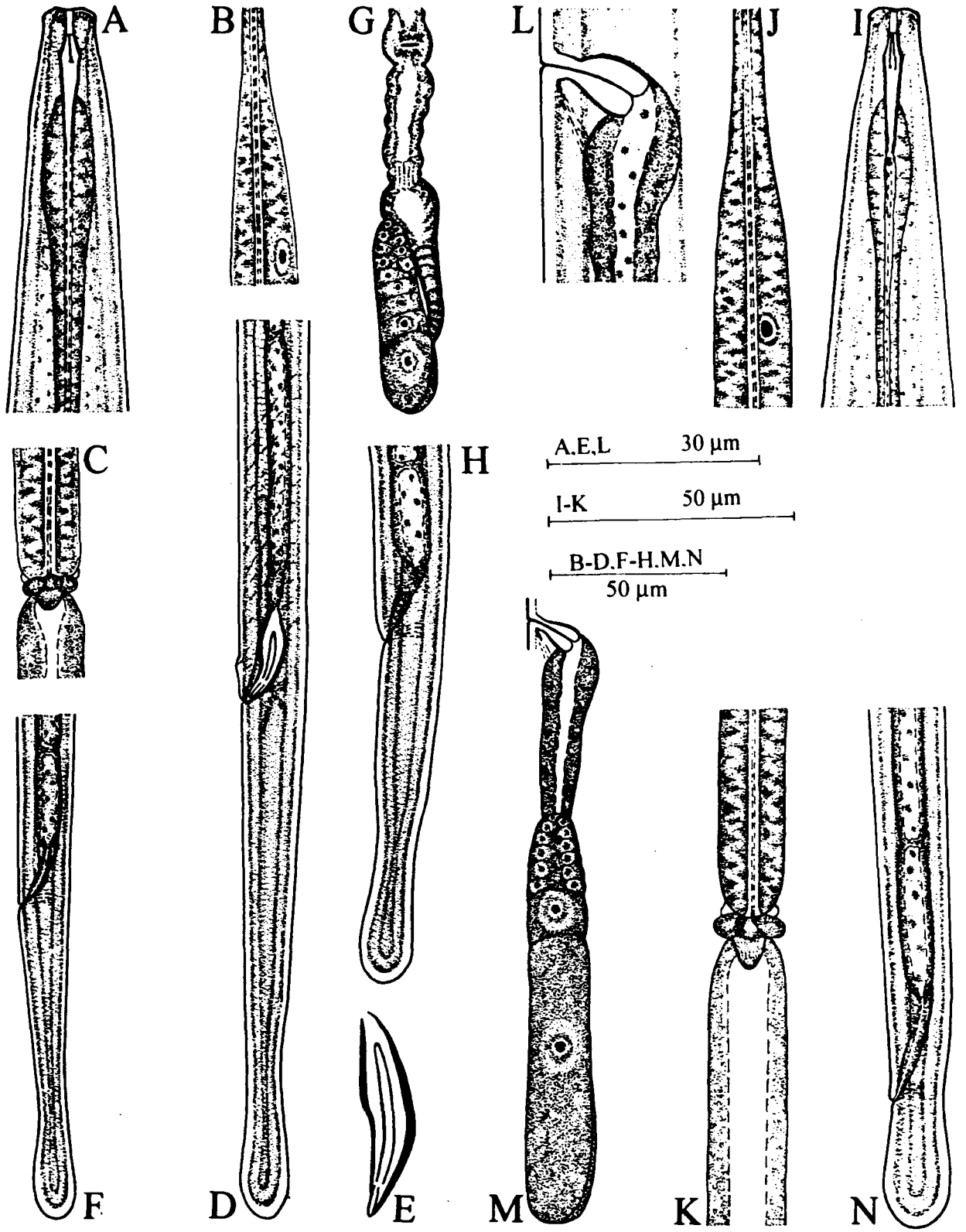

Fig. 32. *Clavicauda differentialis* n.sp. A. Anterior region of juvenile; B. Oesophageal expansion; C. Oesophago-intestinal junction; D. Male posterior region; E. Spicule; F. Posterior region of juvenile.
Clavicauda symmetricus G. Female gonad (posterior); H. Female posterior region; *Nygellus zingli* n.sp. I. Anterior region; J.Oeosphageal expansion; K. Oesophago-intestinal junction; L. Vulval region; M. Female genital branch; N. Female posterior region.

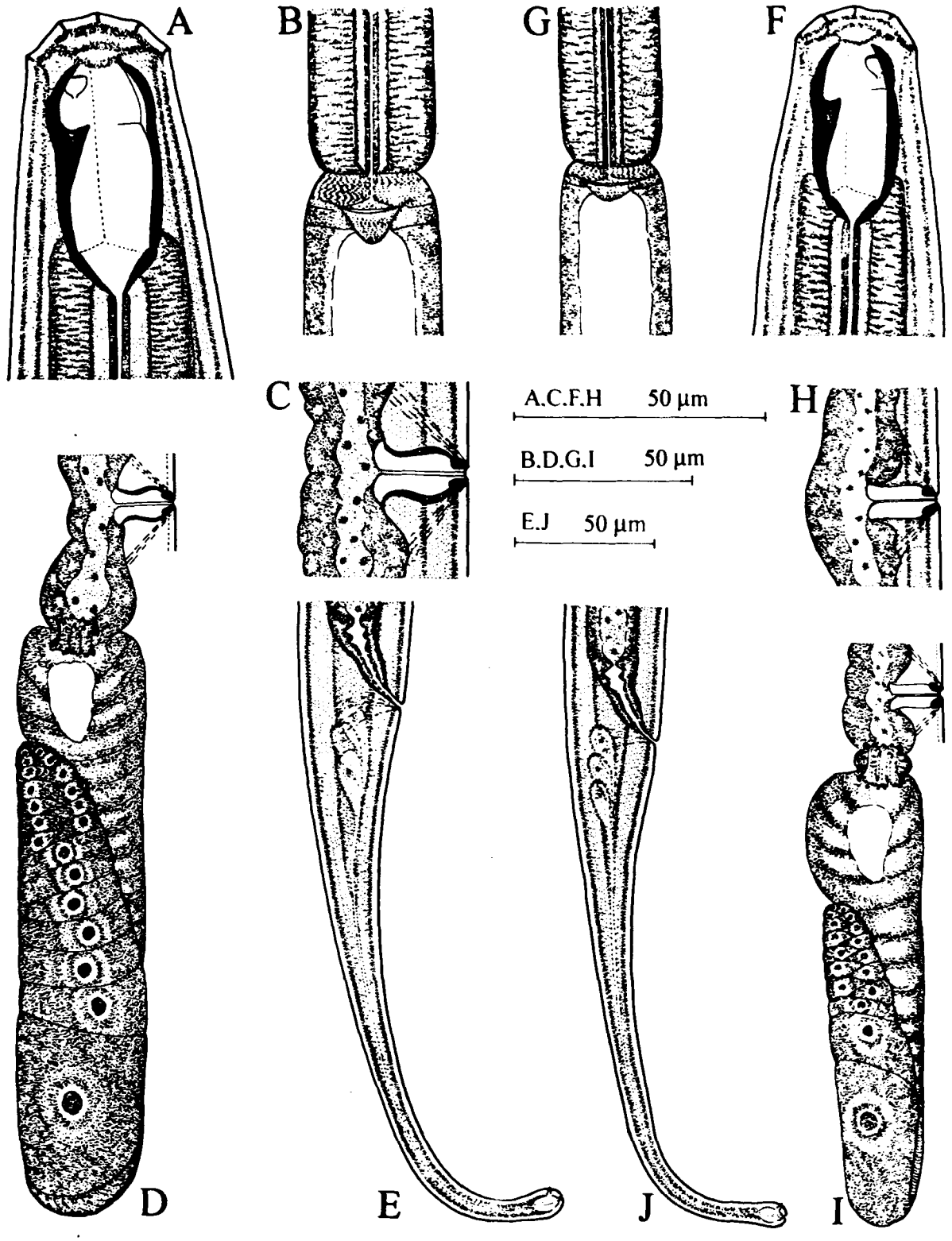

Fig. 33. ***Mononchus oryzae*** n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Vulval region; D. Female gonad (posterior); E. Female posterior region.
Mononchus piperae n.sp. F. Anterior region; G. Oesophago-intestinal junction; H. Vulval region; I. Female gonad (posterior); J. Female posterior region.

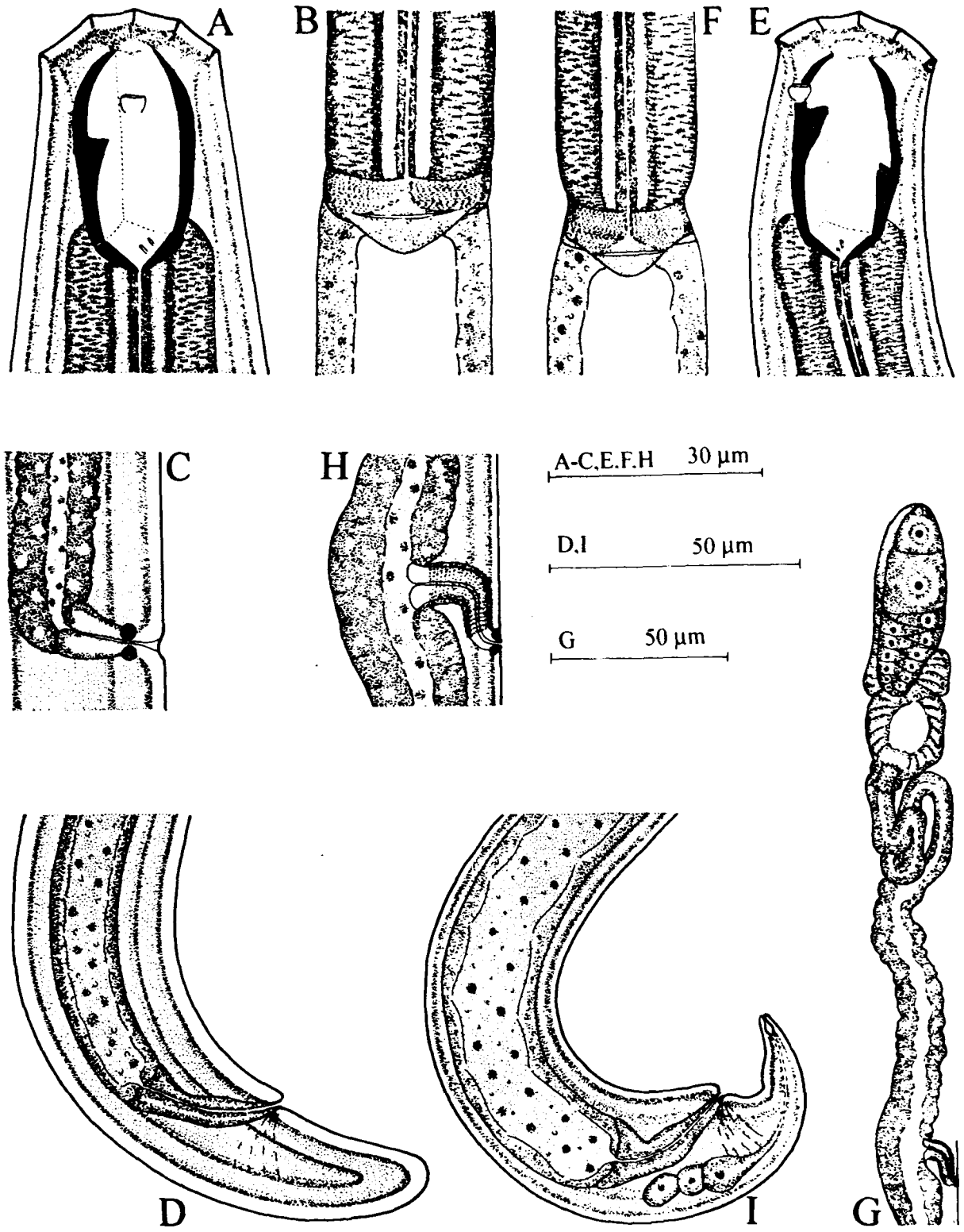

Fig. 34. ***Malnadus malnadi*** n.gen., n.sp. A. Anterior region; B. Oesophago-intestinal junction;C. Vulval region; D. Female posterior region. ***Cobbonchus inclinatus*** n.sp. E. Anterior region; F. Oesophago-intestinal junction; G. Female gonad (anterior); H. Vulval region; I. Female posterior region.

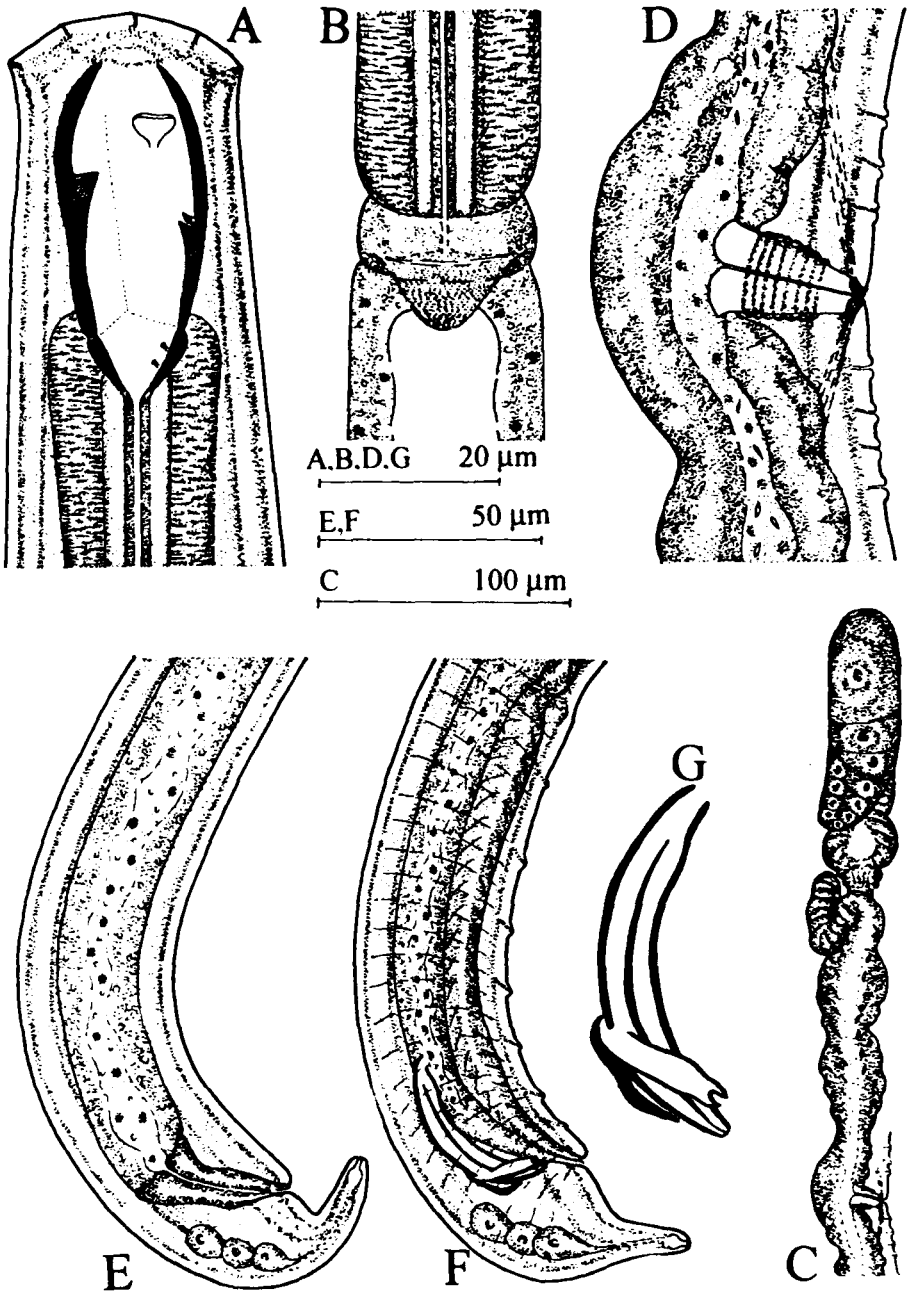

Fig. 35. ***Cobbonchus papillatus*** **n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Female gonad (anterior); D. Vulval region; E. Female posterior region; F. Male posterior region; G. Spicule.**

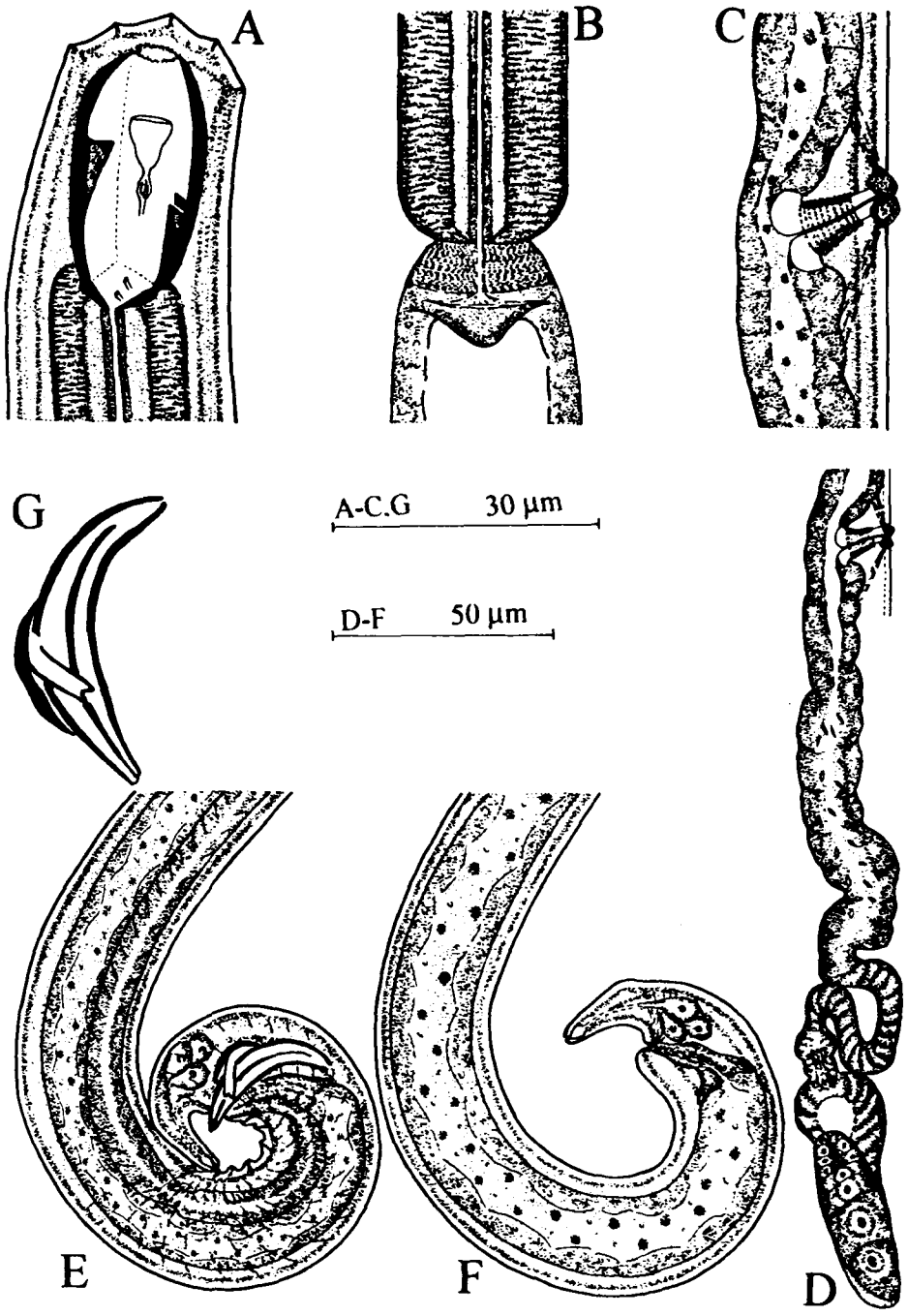

Fig. 36. ***Cobbonchus citri*** n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Vulval region; D. Female gonad (posterior); E. Female posterior region; F. Male posterior region; G. Spicule.

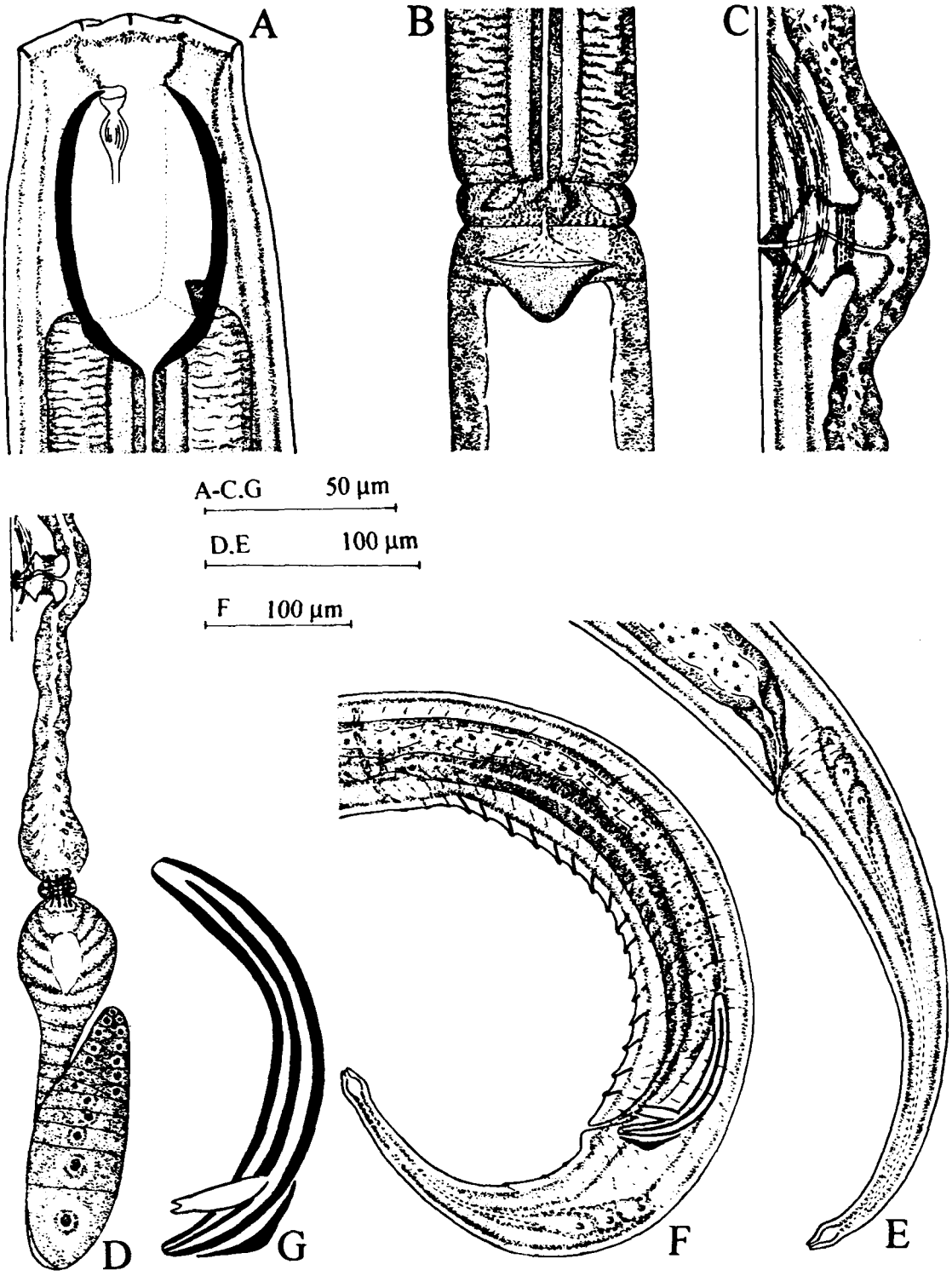

Fig. 37. ***Iotonchus apapillatus*** **n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Vulval region; D. Female gonad (posterior); E. Female posterior region; F. Male posterior region; G. Spicule.**

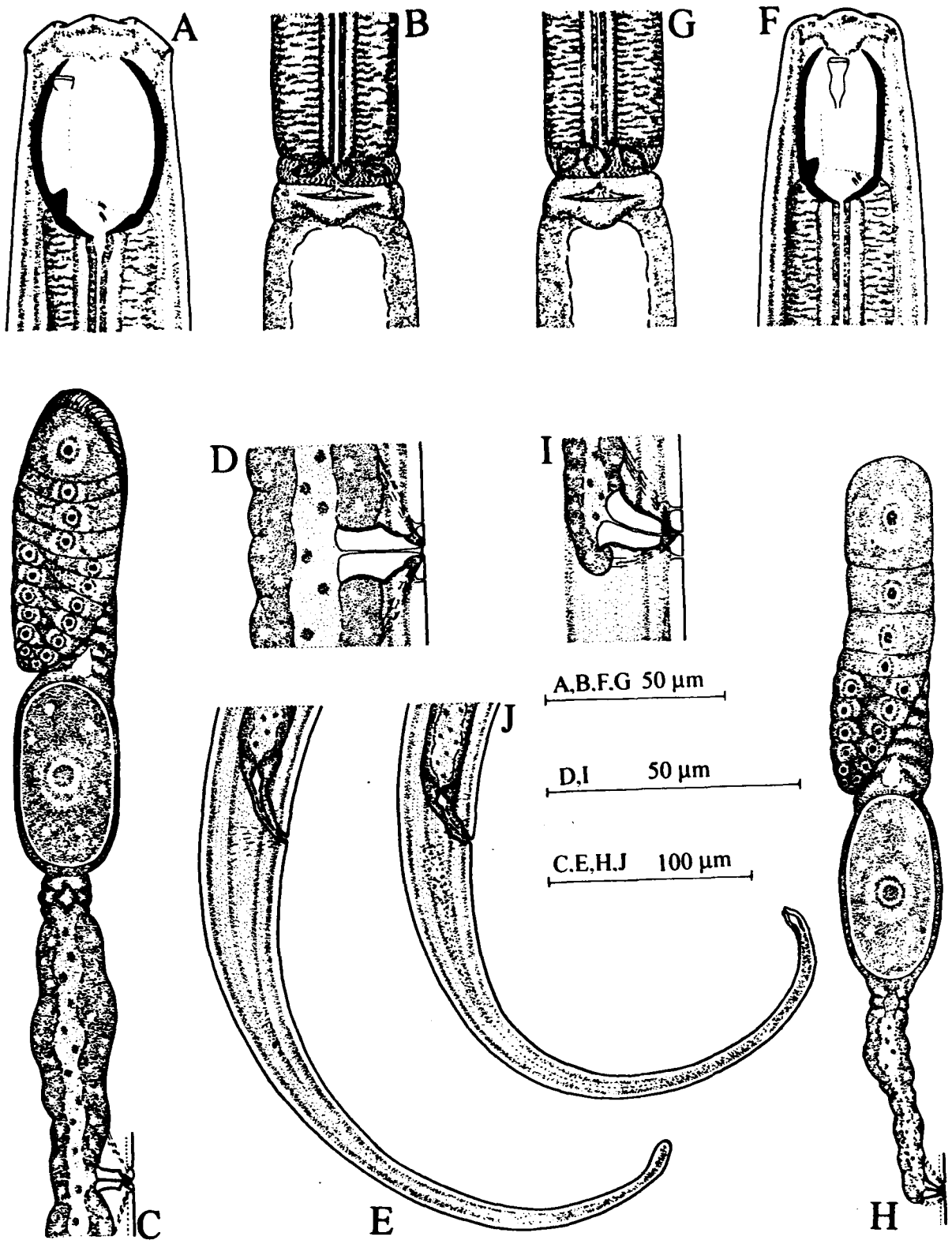

Fig. 38. ***Iotonchus globibucca*** n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Female gonad (anterior); D. Vulval region; E. Female posterior region;
Iotonchus sringerii n.sp. F. Anterior region; G. Oesophago-intestinal junction; H. Female genital branch; I. Vulval region; J. Female posterior region.

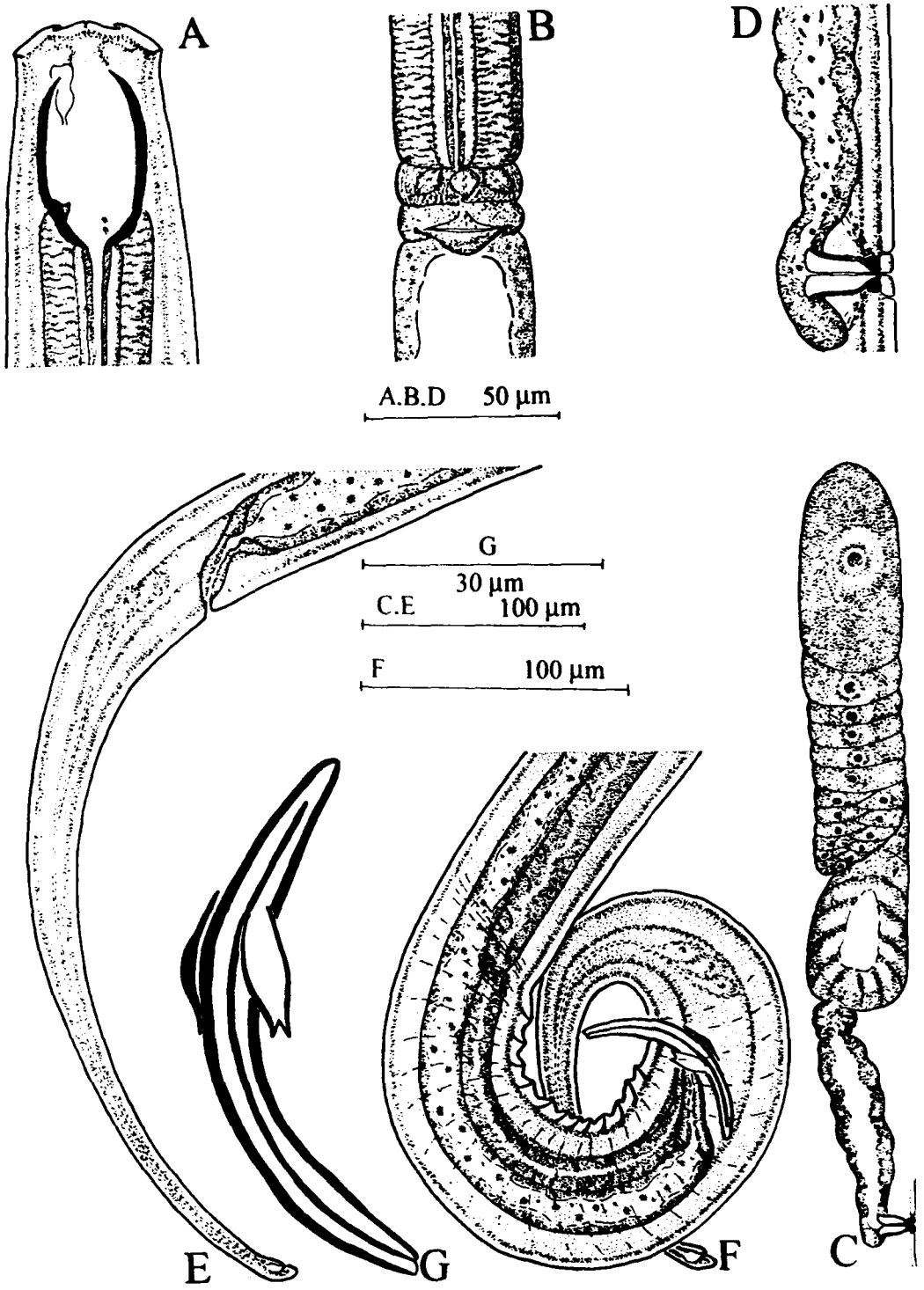

Fig. 39. ***Iotonchus southi*** n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Female genital branch; D. Vulval region; E. Female posterior region; F. Male posterior region;G. Spicule.

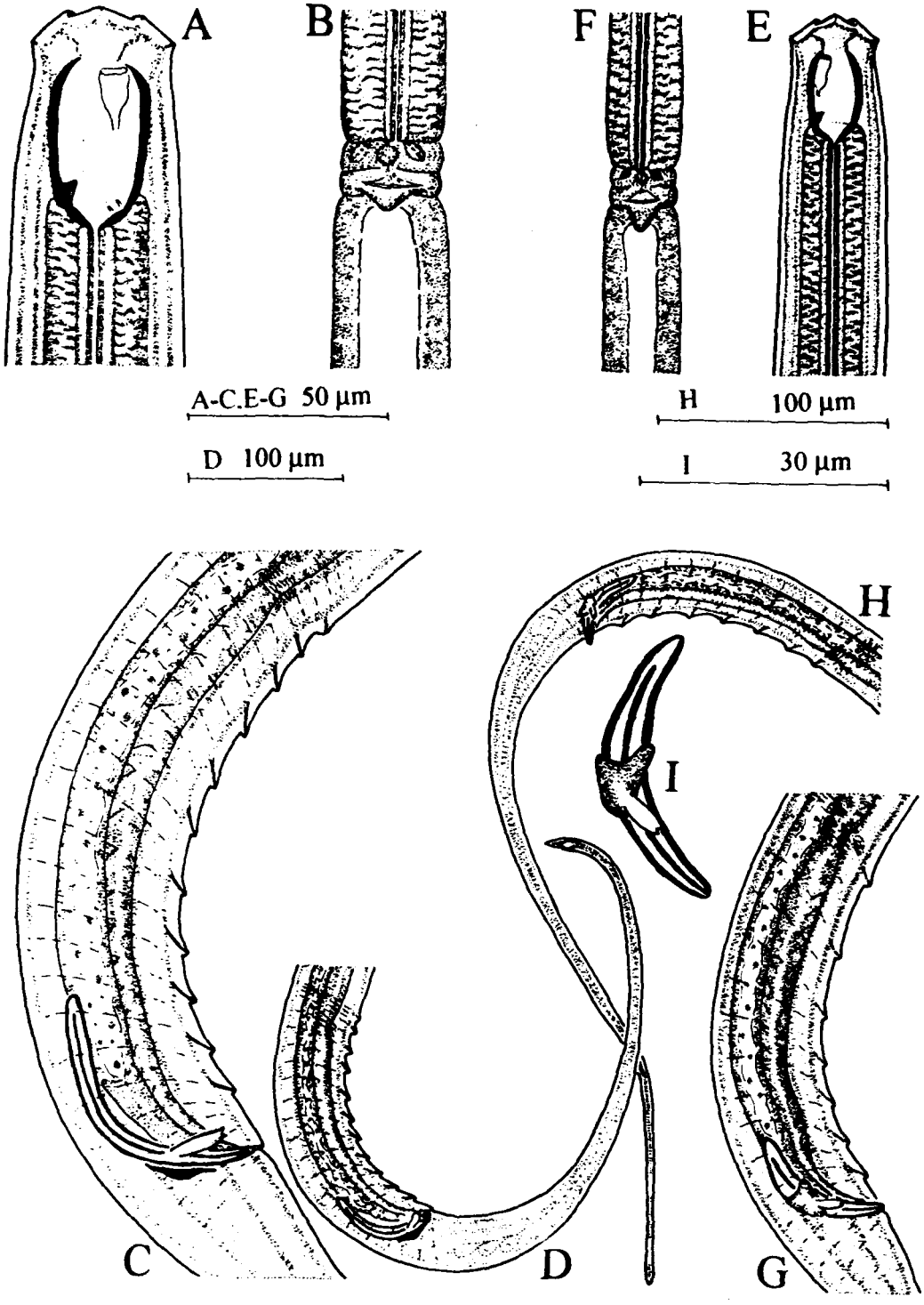

Fig. 40. ***Iotonchus silvallus*** A. Anterior region; B. Oesophago-intestinal junction; C. Male posterior region showing ventromedian supplements and spicule; D. Male posterior region
Iotonchus minutus n.sp. E. Anterior region; F. Oesophago-intestinal junction; G. Male posterior region showing ventromedian supplements and spicule; H. Male posterior region; I. Spicule

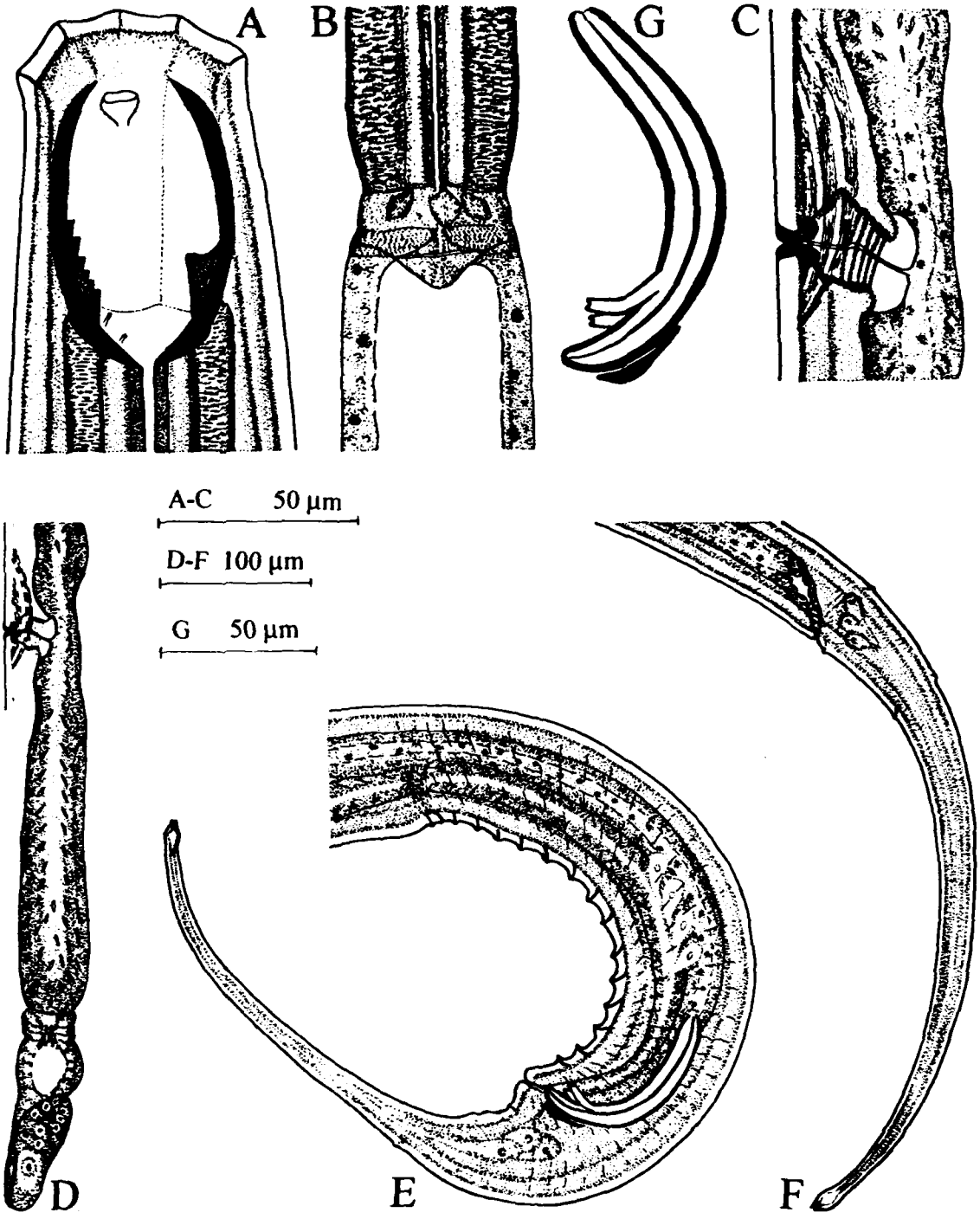

Fig. 41. ***Parahadronchus magnus*** **n.sp. A. Anterior region; B. Oesophago-intestinal junction; C. Vulval region; D. Female gonad (posterior); E. Female posterior region; F. Male posterior region; G. Spicule.**